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CINCINNATI & SONORA

MINING ASSOCIATION.

MAPS AND REPORTS

OF THE

SAN JUAN DEL RIO RANCHE,

IN

Sonora, Mexico.

By CUMMINGS CHERRY and JAMES CHERRY,
GEOLOGISTS AND MINING ENGINEERS.

—ALSO—

REPORT OF SPECIAL COMMITTEE, STATISTICS OF SILVER MINING, TRANSCRIPT OF TITLE, &C.

CINCINNATI:
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REPORT

OF

SPECIAL COMMITTEE.

Messrs. Enoch T. Carson, Chas. C. Reakirt, S. S. Davis,
Jas. D. Thompson, Edgar Conkling, Wm. Wood,
Wm. T. Perkins, Jackson Slane, Jos. Kinsey,
Thos. Spooner, Wm. W. McGrew, Wm. Sumner,
Henry Kessler, John R. Wright, R. H. Collins,

Members of the Cincinnati Land and Mining Association, of Sonora, Mexico.

Gentlemen:—On the 13th of July, 1865, you began in earnest the work of selecting and locating, and thereby vitalizing, the Sonora Concession or Land Grant of Mr. Edgar Conkling, which had been lying idle from the date of its original issue by the Mexican Government to Mr. Charles Denman, March 27, 1857.

In securing the services of Messrs. Cummings Cherry and son James Cherry, Geologists and Mining Engineers, the result has proved that you were exceedingly fortunate. The indomitable energy, cool courage, patient toil, wonderful powers of endurance, and high professional skill exhibited by these gentlemen, under circumstances the most trying and against obstacles well nigh insurmountable, enables us to congratulate you upon a success as magnificent as it is gratifying and astonishing. They have secured for us the most valuable unimproved mining property in North America.

The time of locating this Grant, although deemed inauspicious by intelligent persons both in Sonora and in San Francisco, by reason of the civil war now raging, was in real-

ity the best possible; for hazardous as was the undertaking, we were yet enabled to select the best property, without the competition or opposition that our agents must have encountered, had they reached there when citizens and foreigners were alike devoted to mining and other peaceful pursuits.

Location and Survey.—This Grant of "four square Mexican leagues of untitled lands in Sonora," we had instructed them to locate with special regard to the greatest concentration of minerals, with water and water-power, firewood, timber, and accessibility to market. This happy combination was realized in the selection and survey of the ancient San Juan del Rio ranche, of about 25,000 acres, on the Yaqui River, in latitude 30° 40′ North, and longitude 109° West, about 41 miles South of the Arizona line, 55 miles West of the Chihuahua line, and 250 miles North-East from Guaymas, the best harbor on the Gulf of California. Before deciding upon this property, they had made thorough exploration of at least twenty-eight known Mining Districts, besides many others whose names could not be ascertained. An official survey was made of the property, corner monuments erected, and all the forms of Mexican law strictly complied with; and the National record evidence of title may be expected at an early day, from the Department of Fomento, Colonization, Industry and Commerce of the Mexican Republic, of all of which we have certified documentary evidence.

Accessibility.—By a good wagon road from Guaymas, through San Marcial, Matape, Oposura (or more properly Moctezuma,) Cumpas, and Nacosari, we reach a point as far North as San Juan del Rio, and West of it but ten leagues.

Over this ten leagues was formerly a good wagon road, now needing much repair. About 3 leagues of the distance will

require considerable grading; but by lengthening the route through a pass North of the old trail, a better road can be made, at less expense.

Another route leads from Moctezuma eastward, over a wagon road to Granados, and thence northward along the bed of the Yaqui River through Oputo to San Juan del Rio. A heavier outlay will be needed to make this passable than over the first named route. On either route much of the distance is over roads which have no superior in any country.

Two other routes may be pursued: one through Hermosillo and Ures; the other direct from the mouth of the Yaqui River, following its course to the mines.

The Mines.—The Mines in the vicinity of the old towns of Toapatz and San Juan, the Valenzuello, San Patricio, San Juan, Santa Helena, San Nicholas, and San Filepe mines, besides others whose names are unknown, are embraced within the boundaries of our survey. These were all extensively worked, many years ago. And tradition—the lost archives of the State of Sonora—the historical collections and reports of WARD, WILSON, D'AUMAILLE, Col. BOURNE, MOWRY, BARTLETT, and others—together with the *debris*, deposits of slag and rubbish, outcrops, and still partially exposed excavations—all bear unmistakable testimony to the immense mineral wealth hoarded here. The Valenzuello mine alone, in the short period of two years, yielded over $2,000,000. This vein at the surface is 6 feet, at 40 feet below increases to 10 feet, and seemingly widens with the depth. The San Patricio vein where exposed is not less than 20 feet wide, the San Juan 5 feet, Santa Helena 8 feet, San Nicholas 5 feet, San Filepe 4 feet, while the other veins are each 3 to 6 feet on the surface, and all are likely to widen with the depth. Some of the veins were traced for miles in length.

Minerals.—*Segregated* mineral veins seldom, if ever, justify much outlay to develop them, because they are not permanent. The veins upon the San Juan del Rio property are *true fissure* veins, permanent and reliable in their character, and are of that class which have been fitly styled "the grand repositories of the precious metals." Silver occurs here in almost every form—native, antimonial, sulphurets, silver glance, chloride and chloro-bromide. Copper occurs in the several forms of gray, pyrites, red and black oxides, sulphates, sulphurets, &c. Lead and gold are in quantities to pay abundantly, under scientific processes of separation. Hydraulic lime and fire clay are found, and of superior quality. The imperfect modes of separation and reduction employed by the ancient owners of the mines have left immense deposits which, under the advances latterly made in metallurgy, will release vast quantities of wealth. The unlimited abundance of the ores here is another great feature of value. The San Patricio mine alone would furnish employment for a one hundred stamp mill. And the character of the ores makes them cheaply and easily minable and reducible.

Water Power.—The Yaqui River, a strong and rapid stream—the largest in Sonora, if not the only one deserving the name—runs through this property for eight miles. A few hundred yards below where it enters the property is a cañon or natural gap through the mountain, with high perpendicular walls. A dam here, of 8 feet hight and 400 feet width, at a cost of say $25,000, will furnish water-power for several hundred stamps. Cheaper water-powers can be built, at several points below on the river. This is probably the only mining property in Sonora or Arizona where the supply of water is abundant and inexhaustible, so as entirely to avoid the necessity for steam, and yet keep the mills in *constant* operation.

Timber.—At least one thousand acres are thickly studded with heurigo trees from 3 to 8 feet in diameter, 80 to 120 feet high, and straight as an arrow. Besides this, mesquit, cotton-wood, ash, willow, walnut and sycamore trees cover some five thousand acres. The forest of heurigo timber—the only one known to us in the State—is very valuable. The wood is light, of finer grain than mahogany, susceptible of a beautiful polish, and as indestructible as cedar. It may yet become a source of considerable profit. The mesquit makes superior charcoal, burns long, and gives an intense heat.

Farming Lands.—The River valley on this property, hemmed in by mountains, has some 5,000 acres of rich bottom land, formerly cultivated and highly productiv . Wheat, corn, peas, beans, sugar cane, cotton, tobacco and many other products are all successfully raised in the neighboring settlements. The corn is equal to the best grown in Ohio, while the wheat is very superior, and yields from 100 to 250 bushels for each bushel sown. All the fruits of the tropical and many of the temperate zone thrive here. Pasture exists all the year round, and very nutritious in quality. Thus we will be home producers of all agricultural supplies.

Neighboring Mines.—There are many mines of great wealth within a circuit of 60 miles or more, which are so deficient in water, water-power, and timber, as to be to a great extent dependent upon our property for the beneficiating of their minerals. They must bring no inconsiderable proportion of their ores to us to be stamped and rendered marketable.

Surface Specimens of such of the minerals and woods as were allowed to be brought through the military lines, are now on exhibition in the cabinet of the Association.

Government, &c.—The withdrawal or retirement of the Imperial forces from Sonora, followed up by the Liberals, is steadily restoring some degree of order and quite to the country, and will thus remove the most serious difficulty to early and successful mining. We propose to be pioneers of the great American wave of miners that will flow in by the ocean from San Francisco, or roll down from the segregated mines of Arizona to the great fissure mines of Northern Sonora.

The contrast between the small mining properties of our country—with lodes only a few hundred feet long, valued at half a million to millions of dollars, and annually exporting an aggregate of $20,000,000 of silver and $50,000,000 of gold—and our own, will exhibit in formidable proportions the San Juan del Rio property; with its numerous rich lodes extending miles in length and thousands of feet in depth.

But with all the latent wealth of this large and valuable property, and the practicability of making it available, your Committee, in the light of experience in mining generally, would earnestly recommend the employment of men not only of practical and scientific ability, but who will, beyond a fixed living salary from your limited working capital, be satisfied with a liberal percentage of what it is reasonable to expect may be set aside as a dividend within two years.

Confiding in the integrity of the special report of the Messrs. Cherry, as to the numerous extensive and rich veins of gold, silver, lead, copper, &c., and the practicability of erecting a dam and machinery during the year, and the reasonable amount of outlay to reach a *producing* point, it is not extravagant to say that, before the close of two years, the net products will be equal to at least two thousand dollars *per day*, exceeding a half million dollars annually.

Five per cent. of such profits, added to a fixed moderate salary, will greatly exceed the salary paid to any manager

of ninety-nine in a hundred of the largest mining and manufacturing companies of this country. To expend your working capital in large salaries before reaching a productive point, will not only foolishly exhaust your means, but destroy confidence in your management, and prevent capitalists from uniting with you in furnishing means. The mutual success of capital and skill requires mutual confidence in results; the one hesitating defeats the other. You can alone hope for the bountiful rewards of nature from a liberal expenditure of skill and labor, with a prudent outlay of money. In the difference between receipts and outlays consists your profits, and only as you are watchful of these will this property pay. The policy we recommend is the only one that is mutual, as well as just and protective to stockholders; and now, on the eve of inaugurating an enterprise that may be made a perpetual institution, yielding annually from fifty to one hundred per cent. dividends on your stock of *One Million of Dollars*, is the time to require skill, economy, industry, and honesty, in all your operations, induced by a liberal remuneration from the property itself, and all conducted in a business-like manner, disallowing of the least indebtedness beyond your available means. This policy, of a liberal interest in the net profits, will stimulate managers to realize more than any certain yet large salaries, especially at a point distant and impracticable for the stockholders to visit, and is the strongest guarantee of a wise administration of their interests.

Your mining agents can readily appreciate and confide in this plan for compensation; and hesitancy on their part might well create doubts about your ability to long continue to pay salaries at all. By a firm adherence to this policy, we are confident you can raise $200,000 from the sales of your reserved stock, with which to make your mines certainly productive, and your stock, within twelve months, worth par.

Our confidence in the Report of Messrs. CHERRY is greatly increased from the fact of their assenting to its publication at an early day, endorsed with their reputation for truthfulness and ability, and encourages us to hope for the above results. We may reasonably expect they will, as stockholders, and as discoverers and locators of your mines and property, unite with you in this policy, and arrange to be your Managing Agents. We recommend, in addition to a fixed salary, that you pay them each five per cent. of such sums as may be set apart annually or semi-annually for dividends. If you can thus arrange with them, we recommend an immediate organization of a Stock Company of One Million of Dollars, in shares of one hundred dollars.

The Geological and Mining Report of your Agents, Messrs. CHERRY, is probably the most scientific and reliable now to be obtained of Northern Mexico, and fully confirms the unanimous record of historians and explorers for hundreds of years, that North-eastern Sonora is richer in the precious minerals than any other known territory. The difficulties surmounted by them, resulting from the present war in Mexico and the presence of the contending armies, coupled with their final success in securing what is probably the finest mining property in Mexico, gives us great confidence in their future management in its development, under the policy here recommended.

WM. T. PERKINS,
EDGAR CONKLING,
RICHARD H. COLLINS,
WILLIAM WOOD,
JOHN R. WRIGHT,
JACKSON SLANE,

Committee.

OFFICE OF PITTSBURGH AND BOSTON MINING COMPANY.

PITTSBURGH, July 7, 1865.

CUMMINGS CHERRY, ESQ., *Dear Sir*:

Mr. Carpenter called yesterday to see me in relation to your qualifications to serve his Cincinnati friends in their projected enterprise in Sonora.

I stated to him that for the last twelve or fifteen years you had been absent from Pittsburgh, and employed in the mining regions of the West, where I had no doubt you had acquired much valuable information in relation to the geological and mineralogical character of the country. That your knowledge was no doubt rather of a practical than scientific character, acquired from observation and experience amongst the rocks, more than from the study of books. That in the summer of 1845 you had been employed to explore a tract of land belonging to this Company, in the then new field of mining enterprise on the southern shore of Lake Superior. That your operations were conducted with skill and good judgment, and were eminently successful, resulting in what has since been known as the "Cliff Mine," and from which there has been extracted between six and seven millions of dollars worth of Copper. That your business relations with the Company during the brief period you were in its employ had been in all respects satisfactory. That while I had known but little of your business history during your absence, I had heard nothing to your prejudice in business affairs, nor as to your loyalty to the Government.

Yours respectfully,

THOMAS M. HOWE, *Sec'y P. & B. M. Co.*
C. F. HUSSEY, *President.*
H. CHILDS, *One of the Board of Directors*

GEOLOGICAL REPORT

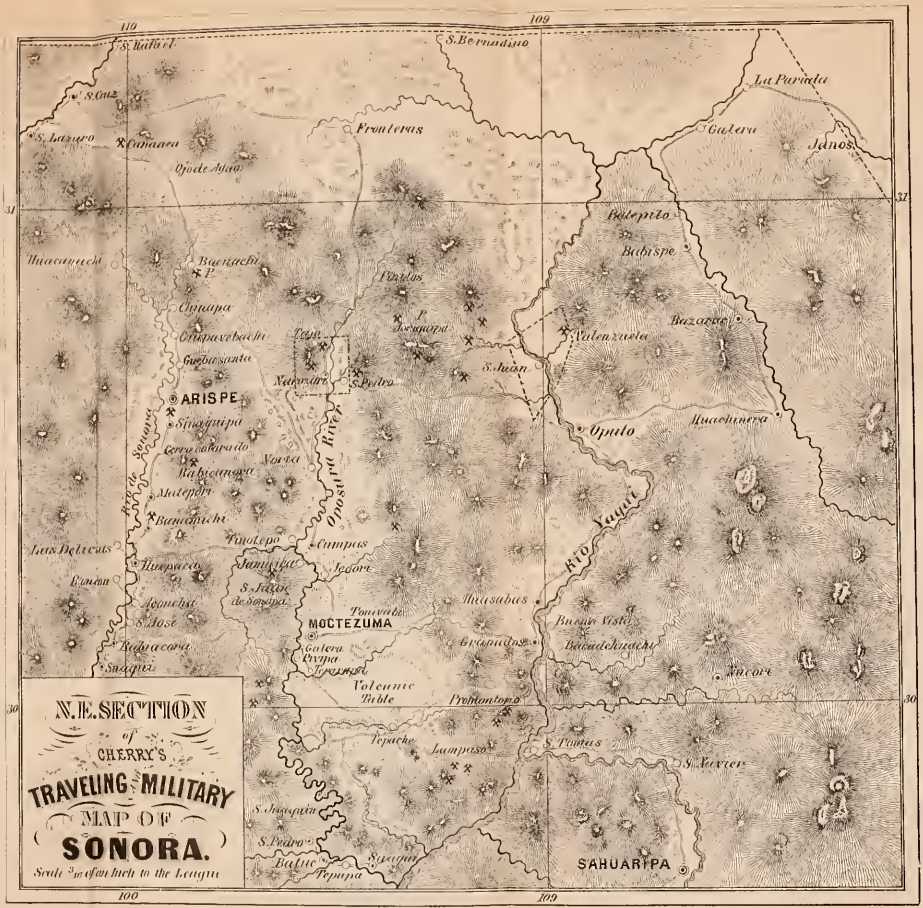
BY

CUMMINGS CHERRY.

To the Members of the Cincinnati Mining & Land Association of Sonora, Mexico :

GENTLEMEN :

In the Articles of Agreement entered into the thirteenth day of July, 1865, it was desired that in locating lands under the grant therein described, I should have special regard to the greatest concentration of minerals, together with water, fire-wood, timber, salt, water-power, and accessibility to market. In my April report from Sonora, I remarked that I had determined upon securing the San Juan del Rio Ranche, for the reason that "among all the lands owned, operated or abandoned, which I had seen in my tour of investigation, I believed the lands which would be comprised in a survey of this property, contained the greatest concentration of the advantages which were deemed requisite to a location of your grant." In after investigations, I saw no reasons to induce me to change this conclusion; and that it was not arrived at hurriedly, or without due investigation, you will understand when I inform you that before determining it, I visited the *minerales* of Hermosillo and vicinity, (Ubarbold, El Aguaje and Subiate,) of San Miguel, San Jose de Gracia, Babiacara, Heupaca, Banamachi, Babicano ra, Cumpas, San Juan Bautiste, Oposura, Tepache, Lam Pa sos, Promontorio, San Juan del Rio, Valenzuello, Nacosari. Fronteras, Bacuáchi, Cananea, Santa Cruz, Planchas de



N.E. SECTION
of
CHERRY'S
TRAVELING MILITARY
MAP OF
SONORA.
Scale 3 miles to an Inch to the League

Plata, Sarique, Magdalena, Santa Theresa, Agua Prieta, Cajon de la Brisca, and very many others whose names I could not ascertain; that, in fact, I visited every section of Northern Sonora wherein I was informed or imagined there existed mineral veins or deposits. I afterwards succeeded in securing this San Juan del Rio property for you, as you will perceive from my General Report, and the documents herewith accompanying.

LOCATION, EXTENT AND TOPOGRAPHY.

The lands of San Juan del Rio, which comprise those of the ancient Ranche of this name, are situated on the Yaqui River, the river coursing through the longitudinal centre of the tract — in latitude 30° 40′ North, and longitude 109° West. They are 5 leagues North of the Mexican town of Oputo, about 15 leagues South of the Arizona line, and 20 leagues West of the Chihuahua line. The distance from the port of Guaymas is 90 leagues. The official survey names the extent of lands, as designated by the boundary monuments which were erected, to be slightly less than four square Mexican leagues, though by accurate measurement there are undoubtedly *six* leagues or more.

The topographical features of the lands are parallel mountain ranges, the intervals between which are plains having a gradual descent from the sierras into a valley of bottom lands of considerable extent. The plains are not always regular, being cut up by creek beds and tributary cañons, or broken by occasional low spurs or ranges of the loftier sierras, and forming in their intervals almost isolated valleys and plateaus; thus giving to the face of the country a mixed or corrugated appearance.

The main mountains are the first steppes of the Sierra Madre, west, lying parallel with the river and forming respectively the East and West limits of these lands. They

rise to a hight of 5000 to 7000 feet and are dissimilar in topography to those parallel ranges yet further West, which, as they approach the California Gulf, become more irregular and broken in their appearance, or those of the North West, which form isolated peaks or detached groups.

ANCIENT HISTORY.

This property forms the centre of a very ancient mining district, whose "mines were legion and ores unsurpassed in richness." Being among the first spots selected by the cultivated Jesuits for the building up of a future home, they quickly brought into subjection the luxuriant wildness of its valleys, and developed the veins of wealth buried in its rugged mountains, until, in the language of those who lived and wrote in those days, it became the "most delightful spot in Mexico." Even at this late day, when we view the evidences of the former existence of a large and flourishing community, in the ruined haciendas and smelting furnaces, and stumble over the dilapidated acequias [irrigating canals] and among the tangled fruit shrubberies, mounds and tumulis, with lines of earth-works, and find fragments of pottery upon every ridge, and note, in all these ruins, a finish and design bespeaking for their projectors a higher grade of civilization than has since visited this unfortunate country, we can imagine how it were possible to make it worthy of even such extravagant encomiums. On March 5th, 1742, when prosperity was at its hight, and the towns were teeming with people and wealth, the Apache Indians made a descent upon it; and in a few hours the settlements of Oputo, Tren, Nori, Toapatz, Terras, Joriquipe, Cherunivava, Pinal, Garrigon, Reál Viejo, Aguaje, Huacal, Nacosari, and Peña were laid waste. The people of Toapatz, Tren, Nori and Joriquipe were all massacred, and there were very few survivers from any. A few venturesome spirits repopulated

Cherunivava; but two years after the reál was again attacked, and its people killed and houses destroyed. Since then no effort has been made to settle these old reáls. In 1800, or shortly after, the mines of the Sierra Valenzuello were discovered by gambucinos, the first who had ventured thus far since the depopulation, 60 years before. So productive were the mines that their fame spread to the southern towns and neighboring State, and soon, a considerable mining population had gathered. The mining reál of San Juan del Rio was quickly built up, forming a large town; reduction furnaces were erected, and prosperity and activity again ruled. Had this activity been permitted to continue, but a short time would have elapsed until the long abandoned mines of the Jesuits would again have been made to yield their tributes of riches to the adventurous; but the Apaches again swarmed in on the almost defenceless people, and being emboldened by the slight resistance shown, they attacked the town, and but few survivors were left to tell the result. Oputo, 5 leagues below, has lately been repopulated; but none of the native inhabitants except an occasional party of gambucinos have ventured farther North.

GEOLOGY AND MINERALOGY.

Geologically the formations of San Juan del Rio differ very materially from those of the more westerly ranges, and particularly, of the North West, (for a description of which see General Report); and *in proportion to this difference is the increased degree of mineral wealth.* The main ranges consist principally of the granitic and metamorphic rocks, the leading crests being capped by a compact gray sienite, having a crystalline base of amphibole, greenish in cast, scattered through which are grains of orthoclase (glassy feldspar), and crystals of actinolite.

I have seen the orthoclase form the main compound, ac-

companied by hornblende in elongated crystals, though these are exceptions. Gneiss and slates are rarely found on the flanks of the sierras, though in the Western (Nacosari) chain they begin to make their appearance; and in the San Juan Bautiste range are found the slates of the palæozoic, sedimentary beds, strongly metamorphosed and twisted and curved until it is almost impossible to trace their relation to other rocks of the formation. On the lower hills is an amorphous hypogene—a cellular black rock, usually in contact with a reddish wacke. The quaternary deposits, stratified and composed of the detritus of the underlying formations, are found only on the mountain flanks, and seem to be the outer edge of that vast area of quaternary deposits which stretch away to the Gulf coast, and to the Colorado River. The lacrustine deposits of the Bacuáchi, Cucurpe and Santa Cruz sections are almost wanting; as are also much of their metamorphosed sandstones and limestones. On the valley plateaus, but never extending up to the main crests, are the stratified conglomerates which form so great a part of the surface formations of the country; they occur in strata of variable texture and thickness, but composed of the quartziferous and feldspathic porphyries of the sierras. In some instances these conglomerates are capped with trappean or basaltic rocks, which form the mountain flanks. The great feature of this section, however, and that which gives it merit above others, is its porphyries which are pre-eminently metalliferous. These are of different varieties, though they are principally quartziferous, and *not* solely hornblendic as some writers have affirmed. The prevailing character is a diorite porphyry, a compact crystalline with a dark greenish cast, and where exposed, discolored through atmospheric action upon the hornblende contained in it; it is particularly distinguished by albite replacing the orthoclase. This is the only locality in which I have seen this diorite

make its appearance. Another class of porphyry, a compact, gray quartziferous with numerous crystals of opaque triclinic feldspar plates of mica and specks of magnetic ore, is prevalent. Higher up are the trachytic porphyries. In contact with the diorite is an amygdaloid, quartziferous and containing delessite with numerous crystals of triclinic feldspar. These rocks are the true metalliferous rocks of the Sierra Madre, and their non-appearance, or the lateral disturbances to which they have been subjected in some places in Western and North Western Sonora, accounts in a degree for the uncertain and irregular nature of veins in those places.

I note, in this connection, the absence in this region of the volcanic peaks, which are so numerous in the North Western fields, and, in consequence, no indications of lateral eruptions which in those other sections have curved, twisted and metamorphosed the differing formations into one conglomeration. I do note the occurrence of a few faults fracturing the surface rocks, but I find they are confined to them and do not affect the relations of the lower strata. They may be accounted for by tension and shrinkage; and it is not difficult to ascertain the amount of their displacement, since stratified rocks of dissimilar character are thus brought into contact. The mineral veins and even the trappean dykes occurring in the formation have all a general parallelism to each other, from which we must infer that here there has been but a single period of eruption, and that to this period the veins of San Juan del Rio owe their origin. Not so, however, in the disturbed ranges of the West or volcanic region of the North West, where—as is shown in my General Report—we have anomalies of geology at every step, primitive rocks capping tertiary, conglomerates carrying sections of quartz veins, mineral veins thrown long distances from their "mother" formations into those directly

antagonistic, or cut off by a plutonic, quaternary cutting igneous, and granites, basalts, and amygdaloids inextricably mixed among sandstones, limestones and quaternary, or fused together in a confused mass; all tending to prove the occurrence here of many epochs of dislocation, and of lateral eruptions following the first grand upheaval of the Sierra Madre above the ocean. The mineral veins in such disturbed sections are found running parallel with the cleavage planes of the formations in which they occur; while those of the San Juan del Rio are found at the junction of formations of dissimilar geological character—as for instance between the diorite and amygdaloid, or the diorite and feldspathic—or occur *across* the cleavage of the plane.

MODE OF OCCURRENCE OF FISSURES.

It would, perhaps, be difficult to determine with accuracy the geological epoch during which the successive chains of the Sierra Madre were uplifted. I have inferred from the geognostic position of the strata that this event took place during the tertiary period. That the East and West parallel ranges were conjointly upheaved with the mother sierra is evident; though, from the overthrow in the tertiary strata forming a feature of the flanking ranges of the great central upheaval, it would appear that the period of convulsion continued during a considerable after-time. That the fissures—which have since been filled with mineral matter—were either formed in this epoch or in the eruptive ones following is without doubt; though the determination of the particular epoch in which they were formed, bears very pertinently on their value as repositories of precious metals. The forces—imprisoned gases or vapors—which tended to cause the upheaval, would also operate to rend apart the solid strata as a means of escape. Near the axis these forces would naturally seek the surface from their

imprisoned depths, rending their way vertically or nearly so, and against the plane of cleavage of the superincumbent strata, or seeking the junction of formations where less resistance would be encountered. Such was the nature of the action which formed fissures in the parallel ranges of San Juan del Rio, and the veins which have been formed in these fissures are true fissure veins—in other words "veins of great linear extent and indefinite depth, filled with an aggregation of mineral matter, with metalliferous ores differing in character from and posterior to the walls in which they are encased." On the outer arc of the circle of upheaval fissures would also be formed, but rather from the vibration from the great disturbance, which vibration we must suppose would disturb, shiver and crack the outer-crusts from the surface downward, without, however, penetrating to great depth; or they may be first called into existence from the settling of the disturbed upheaval, much on the same principle which causes cracks in clays from shrinkage, or in other words from a force of tension, rather than eruption. Such openings are naturally superficial and irregular, and in volcanic ranges where lateral eruptions have occurred, are interrupted in their continuity.

SEGREGATED MINERAL VEINS.

A segregated mineral vein never can possess permanency, and no large mining enterprise based upon such a vein can be of a legitimate character, or prove successful. Without enlarging on this fact, its correctness is proven in the very many stupendous mining enterprises, eventually failures, of Mexico and Arizona, established upon such mineral occurrences, and supported by American and European capital. Veins of a segregated and gash origin are usually richer in metals near the surface than are true veins; and our mining associations or their agents—who have, perhaps, never beheld

a metalliferous vein before, and cannot recognize the precious metals unless they bear Uncle Sam's stamp, and, assuredly, know nothing of their ores—become blinded by the glitter of surface wealth, and ignore the fact that such veins are liable to be contracted or terminate altogether at no considerable depth below the surface, and cannot be depended on as a source of wealth;—else they are *unscrupulously speculative.* While a segregated mineral vein may give fair remuneration to two, three or four individuals of the "bone and sinew" class, who have sufficient stamina to go upon them, and themselves labor in removing the ores, which being so near the surface may be advantageously done by pick and shovel, and extract the metals in the simple but slow methods of the country; to a large mining association whose members are at a distance, and must depend upon the industry, economy and foresight (practical knowledge) of a salaried agent for the success of their enterprise, they will ever prove most disastrous failures. They will not warrant the erection of machinery upon them, or for the reduction of ores, the employing of miners, and making of improvements; by which I mean the erection of such adobe huts as may be needed for shelter, and the payment of a superintendent, without mentioning the kid glove officials, photographists, telegraph operators, astronomers, artists, authors and philosophers, whom some mining associations have deemed very essential to success.

TRUE VEINS, AND THEIR MODE OF OCCURRENCE.

True fissure veins are the grand repositories of the precious metals. Their fissures are regular and *permanent*, and their ores are ever more numerous and evenly disseminated throughout the vein matrix. This will more readily be appreciated by looking into the mode of occurrence of the ores of true veins. Fissures, after being formed in the

manner I have explained, naturally become channels for the percolation of water, which in passing through different strata of formation, become charged, more or less, with various metallic and mineral compounds. This fluid while highly heated and under intense pressure of the immense superincumbent mass—for it penetrates to great depths—and probably already holding in solution acidiferous substances, becomes a solvent in different forms of all the elements entering into the structure of the encasing rocks. Such solution, passing through an almost interminable fissure and coming in contact with different strata, may be so influenced by the electric chemical action thus aroused as to combine directly with and gather the metalliferous particles previously existing in the rocks, and upon passing into a different circulation of currents, or coming in contact with a compound differing in nature, slowly deposit the metallic substance upon the walls of the fissure; and the result is the formation of a true mineral vein in which the chemical process of formation and the dissemination of mineral will have been complete in proportion as depth below the antagonism of the elements is attained. Though in the Western and North Western portions of Sonora the greatest number of the veins are segregated, I could not with justice rank them all as such; there are true veins apparently isolated. In the parallel ranges occurring in the San Juan del Rio property, however, are the *only systems* of true fissure veins I have seen in the country; and in this fact is one of my pertinent reasons for preferring its lands over others. I had in view your desire, expressed verbally, to secure only such property as you could fearlessly and honestly represent as property of merit and *permanent* value.

I have spoken of the ancient history of the San Juan del Rio property, and immediate vicinity. I have seen no locality in all my investigations wherein are equal eviden-

Office of the **Cincinnati and Sonora Mining Association.**

73 West Third Street, Cincinnati, O., October 10, 1866.

SIR:—

We invite your careful perusal of the Report of our ***Gold and Silver Mining Property,*** in Sonora, Mexico:

I.—This property is about ***40*** miles South of the United States boundary line, near which ***one of the great lines of the Pacific Railroad*** will be completed within a few years, and before that time, from present indications, Northern Mexico will almost certainly become a part of the United States.

II.—Instead of only ***1,200 feet,*** the size of many of the best Silver Mining properties, held at prices greatly exceeding the price affixed to this, we have from ***20,000*** to ***25,000 acres,*** embracing many mines of ***known value,*** with veins extending for miles, from ***3*** to ***20 feet*** in width. Some of these mines have a historic or traditional value, having yielded ***Millions of Dollars,*** and are ***practically*** inexhaustible. The same was selected in person, by two competent experienced geologists, of high character for honesty and ability, men of fine business qualifications and of property, who came to us highly recommended by some of the most responsible and influential of the business men of Pittsburgh. They devoted months in personal examination of that country, its mining records, etc., before selecting this *Ranche*.

III.—Such a concentration of all the elements of mining wealth, and facilities for mining, we believe is not excelled elsewhere in the world; the finest timber of great extent, exhaustless water power, superior agricultural lands, cheap and skilled labor, rich and easily reduced ores, and good roads to market. Added to all this, the almost entire absence of water-power and of fuel for smelting and steam-power, in the rich and contignous mining territory, will make it exceedingly profitable for us to beneficiate their ores.

IV.—By our Report, it will be seen, that competent parties, who are willing to become resident managers, estimate that a sum much less than our proposed working capital, is ample to make our property productive for ***extended improvements*** and for ***monthly dividends in gold.***

V.—We propose to organize a company here of ***FIVE MILLIONS OF DOLLARS CAPITAL,*** and to offer for sale one-half the stock, ***$2,500,000,*** at ***ten*** per cent., producing ***$250,000,*** of which $50,000 and one half of the stock, $2,500,000, to be retained by the present Association for the property, leaving ***$200,000 in cash in the Treasury for a working capital,*** and thereby giving a present value to the stock of fully ***20 per cent.***

VI.—This property, with ***$200,000*** in the Treasury for its rapid development, can be made to yield ***ONE to TWO MILLIONS of Dollars within two years;*** and thereafter, a gradually increasing amount, with the increased facilities for reducing our own and surrounding ores—which must rapidly advance the stock to its ***par value in gold.***

VII.—The present owners of this property are residents of Cincinnati, and feel desirous of continuing its ownership, control, and dividends to this city as a permanent Institution, and to retain their stock as a permanent investment equal to any other stock of this country.

ces of a former extensive mining prosperity. I was prepared to see indications of old mines, but not in such surprising frequency and extent. From the river banks, pack-trails wind in labyrinthian folds up and down mountains, through cañons and over precipitous ridges, until they arrive at ancient workings, where one would least think of searching for them. We find these old workings crumbled in and filled with debris, and grown over with dense thickets of mesquit, giving evidence of the great lapse of time during which they have been undisturbed, and making it almost impossible to discern them, were it not for the debris banks in their vicinity. Near them are the crumbled walls of their reduction haciendas, immense heaps of scoria from their furnaces, and decayed towns. As if these were not sufficient for the wants of this ancient mining community, we find on the river banks within the space of a league, the ruins of four other towns seemingly of former extent, and other reduction works and slag heaps, all, too, grown over with mesquit and other trees 6 inches to 2 feet in diameter.

TOAPATZ MINES.

Half a league back of the ruins of Toapatz are numerous rubbish banks and nearly filled openings, the only existing evidences of a series of rich and profitably worked mines. So long, however, have they been abandoned, and so very few were the survivors of the Apache descent upon them, (none, it is believed, escaped from Toapatz and neighboring towns,) that the names by which they were designated are now unknown, and tradition can give no particulars beyond the fact that they were extensive and rich. I could determine only from the debris and encasing rocks, and from appearances at the slight depth I could attain in the openings, that their veins were well defined, with even and striated walls. I examined the debris banks for specimens of the

VIII.—For a limited time only, they will furnish the citizens of Cincinnati the opportunity of owning and controlling probably the best mining property on this continent, at a price greatly less than its intrinsic value, or, that it will bring in New York. In evidence of which, we refer to our Reports, with Maps, to be obtained on application to HENRY KESSLER, at the Office of the ***Eagle Insurance Company,*** 73 West Third Street, or of any of the Shareholders, as follows:

ENOCH T. CARSON,	JAS. D. THOMPSON,	WILLIAM T. PERKINS,
THOS. SPOONER,	HENRY KESSLER,	CHAS. C. REAKIRT,
EDGAR CONKLING,	JACKSON SLANE,	JOHN R. WRIGHT,
WILLIAM SUMNER,	S. S. DAVIS,	WILLIAM WOOD,
THOS. J. M'COY,	JOSEPH KINSEY,	R. H. COLLINS.

Whereas, The members of the **Cincinnati & Sonora Mining Association,** hereby obligate themselves to dispose of one-half of their San Juan del Rio Mining Ranche, in Sonora, Mexico, for the sum of Two Hundred and Fifty Thousand Dollars, cash, and to appropriate ***Two Hundred Thousand Dollars thereof as working capital,*** provided subscribers thereto shall have paid to S. S. Davis & Co., Bankers, the said sum, on or about the 1st day of November, 1866: Now therefore, in order to purchase the same, it is proposed to form a ***Joint Stock Company*** in Cincinnati, O., to be called the

CINCINNATI & SONORA MINING COMPANY,

With $5,000,000 Capital Stock,

In 50,000 shares of $100 each, and after reserving one-half of the stock, with $50,000 cash, to pay said Association for said Ranche, to sell the remaining half of the stock at 10 per cent., or ***$10 in full payment for each share of $100,*** the same payable to said Bankers, so soon as the $2,500,000 of stock are subscribed for, on, or about the 1st of November, 1866, to be by them held in trust for payors until the organization of said Stock Company—whereupon $50,000 shall be paid to the original Shareholders of said Association, and $200,000 be subject to the order of the Directors of the said ***Cincinnati and Sonora Mining Company.***

So soon as said stock is all subscribed and paid for, all the Stockholders shall assemble, organize the Stock Company, and elect their Directors—when the said Association shall deliver to said Stock Company a transfer of their title to said *Ranche.*

The Undersigned hereby subscribe, and agree to take and pay for the number of Shares opposite their respective names, at $10 per Share, on the conditions proposed above:

ores, but they had been so carefully culled over by the gambucinos that I could find none. From the furnace scoria, and also from portions of vein matter which I secured from the best preserved openings, I could determine, however, that the ores were principally argentiferous (smelting ores) —the resultants, in part, of the decomposition of sulphurets, occurring in ferruginous earths, though from certain appearances of "azogue" ores (black and gray sulphurets) in debris from the most extensive workings, I should conclude that the zone of decomposition is not great. The veins are a foot to five feet in width, and show evidence of an increase with depth below the surface.

SAN JUAN DEL RIO MINES.

South West of the old town of San Juan del Rio, and in its vicinity, is another ancient mining section, with equal evidences of numerous old mines and extensive workings, also unknown, except that "its mines were successfully operated contemporary with those of the Toapatz; and abandoned with the extinction" of its people by the Apaches. The remarks concerning the ores, etc., of the Toapatz are equally applicable to these. In late years, armed parties of gambucinos have visited these mines on several occasions, and secured considerable ores from their dirt piles, and, also, from the best preserved openings, which they have packed to Oputo upon their backs, and there reduced by smelting; in this manner securing 2 to $3\frac{1}{2}$ marcs [8 dollars] to the arroba [25 pounds.] These ores are highly valued by the miners, because of the ease and simplicity of their reduction. I formed a favorable opinion of these abandoned mines of Toapatz reál and vicinity.

VALENZUELLO MOUNTAIN.—MINERAL OCCURRENCES.

The most celebrated, because the most recently worked and best known, of the mines occurring in the San Juan del Rio property, are those which occur in the Valenzuello mountain—so called from its principal mine. This mountain is in the north-east corner of the property, and located as laid down in the chart of survey. It occurs at the foot of the main mountain, surrounded by others, and entirely encircled by arroyas [creeks,] which meet and discharge themselves at the south-east end, in a cañon connecting with the river. It has a rounded appearance, gradually tapering at either end, and rising to a hight of over 600 feet above the creek beds. In geological features, it agrees with the statement I have already given. The mountain is about a league long, and half a league wide, or perhaps wider, and it contains the most complete system of contemporaneous metalliferous veins I have seen in the country. They are eight in number, six of which have bold and regular outcrops, while the others show surface indications of their existence and course. There are occurrences of the surface rocks which would have me form the belief that even more metalliferous veins than those which I have recognized, occur in the mountain, and, with a little attention, may be discovered. The veins have a course N. 17° E., and pass diagonally through the mountain from arroya to arroya, and disappear in the adjacent ranges; thus giving to them a linear extent of nearly a league, in which they present bold outcrops, with neither fault nor irregularity visible. Tradition and record have preserved the names by which six of them were designated. They occur from east to west, in the order in which I give their names, viz.: Valenzuello, San Juan, San Patricio, Santa Helena, San Nicholas, and San Filepe. The occurrence of encasing rocks, vein matrices and ores in the mines, and in all the veins occurring in this

mountain, is so nearly identical, that a description of one may, with equal correctness, apply to all.

VALENZUELLO MINE.

The Valenzuello is the most ancient of these mines, and, seemingly the most extensively worked. It was first discovered by a Mexican named Valenzuello, and worked by him for a period of two years: during which, from his and others' statements, he extracted metals which yielded him over two millions of dollars. In his prosperity, he erected a church at Oputo, which is yet standing, and made a custom to take his stand upon its roof, and throw handsful of money to the scrambling crowd below.

Through the removal of the pillars of support by the inevitable gambucino and the action of time, portions of the encasing rocks and rubbish had fallen into the openings, nearly filling them. I believe, however, from the linear extent of the old workings, and the limited quantities of rubbish at any single point, that work was prosecuted *along* the vein, rather than down upon it; and, in consequence, its lower workings have not attained great depths, not more, perhaps, than 120 to 150 feet. I took advantage of the deepest existing excavations, to descend some 40 feet below the surface. The vein occurs across the cleavage of the plane of formation, a diorite with a heavy, blackish green cast, and of a compact crystalline texture, with triclinic albite, having a bluish opalescence, and crystals of thulite epidote. These encasing rocks are strongly defined, regular and striated; the vein is nearly vertical, with a matrix of quartz, ferruginous, and comby, within the zone of decomposition, and below, a compact crystalline; its thickness at the surface is six feet, which, at the lowest depth I could penetrate, had increased to ten feet, and was, seemingly, continuing to widen with depth. The original ores are the "azogue" and

"patanque" of the Mexican miners, changed to the "colorados," or smelting ores, near the surface. Chloride and chloro-bromide (embolite) occur in the ferruginous gangue; in the quartz is the black sulphuret and polybasite, accompanied by blende, and a little lead. Native silver occurs in the comby parts of the vein, and particularly at the junction of the chloride and sulphuret. The ores seemed very thickly and evenly disseminated throughout the vein; and in the bottom of the excavation in which I examined, the sulphuret and antimonial ores, with their accompanying minerals, seemed to form an almost solid mass from wall to wall.

SAN PATRICIO.

The San Patricio vein outcrops very boldly; its crest ores stand ten to twenty feet above the surface, and thus continue up the mountain sides and the summit ridge without break, interruption, or irregularity in its course. It is a surprisingly well defined vein. The outcrop shows vitreous stains of copper, and specks of silver glance. Excavations had been made upon the vein from the arroya where it intersected it. I could determine nothing of their extent, as they were filled in with the rubbish, washed in during high water; and the greater part of the debris from the mine had been carried away through the same cause. On the extreme summit peak of the mountain—over 600 feet above the arroyas—and where the vein crosses, an excavation had been made, partially in the quartz gangue, and partly in a syenite, here overlying the diorite. I could not determine, correctly, the width of the vein from this opening, as it exposed but one of the walls, though, from the appearance of its outcrop, I concluded it was not less than 20 feet wide. All the varieties of ores which are found in the Valenzuello, occur here; though the chlorides

and chloro-bromides are found only near the junction of the vein matrix with the encasing walls, and are necessarily in very limited quantities. This vein has undergone very slight changes through decomposition from its original form, and, as a result, the sulphuret ores occur at, or very near the surface; and this may account for the fact that it has not been so extensively worked by the ancients as the Valenzuello and other neighboring ones. The ores have an increase in blende and galena over those of the Valenzuello, and occurrences of stromeyerite, (silver-copper glance); the matrix is not so heavily charged with them, and they would require to be assorted—though it is doing injustice to judge of this class of ores, which require a reasonable depth to complete their chemical formation and distribution, from surface specimens.

The matrix of the San Juan shows blue and green carbonates of copper, with black manganese and specks of silver glance in the surface outcrop. The Santa Helena, San Nicholas, and San Filepe, have a number of old excavations which are now hardly discernible. They were, seemingly, confined to the decomposed ores, and were of linear extent rather than depth. This will apply also to the other veins whose names are unknown. Their matrices and distribution of ores are identical with the Valenzuello, and differ in a similar ratio from the San Patricio. The vertical extent of the ferruginous gangue and its accompanying chloride and chloro-bromide ores I imagine to be a medium between the two above described. As metalliferous veins, they are equally as promising and worthy of attention. The vein of San Juan is five feet wide, Santa Helena eight feet, San Nicholas five feet, and San Filepe four feet; the other veins are each three to six feet in thickness on the surface, and, like the Valenzuello, are liable to widen with depth.

LAS PLOMOSAS.

To the west of the Valenzuello mountain, are two mines, which may not properly be classed with those occurring in its limits. I could not learn their names, except that they were "Minas las Plomosas" (the lead mines), nor secure any reliable information as to the period in which they were worked; though, I imagine, from their excavations, they were operated during both periods of activity which have visited this section. I will describe the principal one. The vein occurs in a grayish feldspathic granite, coarsely crystaline; the matrix is quartz, and the ores are an argentiferous galena, which, near the surface, is found changed to a carbonate of lead. It averages six inches to three feet in thickness, and is otherwise well defined. It has been extensively worked, though recent cavings deterred us from exploring its depths, which are not very considerable—I should think 150 feet. The neighboring mine has a similar occurrence of encasing rocks and ores, though it has not been so extensively worked. These mines have also been resorted to in late years by gambucinos, who packed the ores to Oputo upon their backs, and there reduced them, securing $1\frac{1}{2}$ to 3 marcs of silver per arroba. They tell of finding masses of silver in its native state, near the surface; they were the resultants of decomposition—the metal having become separated, and concentrated into dendritic bunches. They also tell of the existence of several labors in good ores in the principal mine, but which they can not now reach, because of recent cavings.

In locating the San Juan del Rio property, my object was not only to secure the great concentration of mines and metalliferous veins which it presented in itself, and which alone made it superior to others, but also, to encompass within its limits the essentials of successful mining, viz.: timber, water-powers, agricultural lands, and road facilities,

so that, if desired, the rich mines of the Nacosari range to the north and north-west might be *within its control. In this purpose I was successful.*

JORIQUIPE PLACERS.

Following the Joriquipe cañon—which enters the Yaqui River in the north-west corner of the San Juan del Rio property—for a distance of $1\frac{1}{2}$ leagues west, we enter a quaternary, which was formerly worked extensively for its placer gold. Before the abandonment of the country, and when the neighboring mines were being worked, several hundred miners gathered at these placers every season. The evidences of their success are visible in the many heavy excavations made in the diluvium, and in the ruins of a large mining reál—Joriquipe Pueblo. These placers were only available during the rainy season—from June to November. On the elevated flats, the surface of the deposits are generally covered with a reddish loam, mixed with small gravel; while on the bed rock, and above it, is a stratum containing bowlders and gravel, in which the gold is found in coarse flakes. It was no uncommon thing to find nuggets weighing from one to five ounces. These placers are extensive, and, during the rainy season, may be profitably worked.

SAN PEDRO.

Continuing west from Joriquipe, a distance of 3 leagues brings us to the San Pedro mine and reál, abandoned since the Apache descent in 1742. The mine, which is on the side of a mountain, first attracted me by the immense quantities of rubbish which had been thrown from it. The ancient works consist of an immense open cut, up and over the mountain, and continuing into other elevations, the length of which can not be less than a mile. This cut varies from

3 to 15 feet in width, and is open in places to a depth of 50 feet, but with rubbish in the bottom, which would indicate that it had been deeper. Here, as elsewhere in this section, I found that the banks of waste had been so carefully culled over, that I could scarcely find a sufficient vestige of the ores to determine their character. The mountain formation is a fine grained quartziferous porphyry with quartz crystals and pyramidal pink crystals of orthoclase. The parting from the vein is not smooth, and, in the portions which have been worked, masses of the quartz gangue of the vein yet remain attached to them. The vein is, however, strongly defined, and a true fissure vein. Its ores are argentiferous galena, containing a heavy percentage of silver, and chloride in the more ferruginous and decomposed veinstones. Native silver accompanying the chloride is very frequent. Tradition and documentary evidence are eloquent in speaking of the extreme richness of the ores of this mine.

One hundred yards north of the San Pedro, and in the same mountain, is another vein running parallel. It has been worked in a number of places to a considerable extent. The vein matrix is 3 to 5 feet thick, and the ores are similar to those of the San Pedro.

On the south side of the mountain is an ancient mine, having three openings, connected by a *taho*, or open cut upon the vein. This taho is about 150 yards in length; its depth was not great, but portions of the encasing walls and of the rubbish on its edges had fallen, and been washed into it. Two of the mouths or openings were closed; the other was partially open, into which I descended thirty feet to where it had caved. The ores do not differ from the San Pedro varieties. The old reál of San Pedro, in the immediate vicinity, had been large and substantially built, and the immense heaps of scoria visible show to what extent the ores of the neighboring mines had been worked.

HUACAL.

Scarcely half a mile from the San Pedro, is the Huacal, of which tradition speaks as being a mine of nearly pure silver. Immense dirt heaps high up on the mountain side, are the first evidences we have of the existence of this mine. There are a series of excavations along the course of the vein, some to a depth of one hundred feet. What is supposed to be the main opening is pointed out; it is now covered with debris, and tradition has it that it was designedly closed by the former owners when obliged to abandon it. However this may be, it is very evident that this mine has been rich, and profitably worked. The encasing walls are similar to the formation of the San Pedro mountain, except that there is an appearance of petrosilex. The vein is strong and well defined, almost vertical, and with an easy parting from the walls; its quartz gangue is a soft, decomposed crystalline, through which the ores are thickly and evenly disseminated. Its ores are argentiferous, accompanied by native silver. In the rubbish from the openings I found antimonial sulphuret of lead and silver (frieslebenite) and black sulphuret occurrences, which would have me believe that in the deeper workings these ores were making their appearance. The width of the vein is about five feet. The ruins of the ancient reál of Huacal, with the ever accompanying scoria piles, are at the foot of the mountain.

EL ROSARIO.

Yet a mile further west, and situated high up on the southern face of a lofty mountain, is the El Rosario mine, which has been very extensively worked. An open cut follows the vein a distance of several hundred yards; there are several nearly vertical openings, the principal one of which may be descended to a depth of 200 feet. It is ap-

parent that at this depth excavations have been made a considerable distance in the vein, though cavings have occurred which will not permit them to be explored. The encasing formation is a compact gray porphyry, containing triclinic mica and quartz crystals. The vein is exceedingly well defined and is nearly vertical. The predominating ore is a chloro-bromide, accompanied with argentiferous galena and blende, the latter barely distinguishable. The vein has been worked to a width of 6 to 10 feet, and it is evident that in its workings a superior system of mining to that which has generally been followed in this country was adopted. It would appear that this mine has been one of superior merit.

On the northern face of the mountain are several workings, all of extent. One of these is supposed to be a continuation of the Rosario; the others—two in number—occur on veins; one three and the other five feet wide. Their formations and ores are identical with those of the Rosario.

DON EDUARDO.

South-west of the San Pedro but a short distance is the Don Eduardo, which has seemingly been little worked. A shaft sunk on the vein outcrop on the side of a ravine had partially caved, leaving the opening about 20 feet in depth. The rubbish from the excavation contained a few samples of the ore, which I found to be a bromyerite (bromic silver), accompanied by small crystals of a beautiful azurite (a blue carbonate of copper, differing from malachite in containing a hydrated oxide in conjunction with the carbonate), occurring in a matrix of silicious clay and comby barytes. I think if put to a careful test the gangue will be found to contain small particles of both silver and copper, in their native state. The vein is well defined, occurring in a feldspathic

granite, with triclinic amphodelite of a dingy red, and prismatic mica. It can be traced by its outcrop a distance of a mile or more. It is evident that its class of ores were not understood by the native miners.

CHERUNIVAVA.

In the midst of mines whose riches occasioned astonishment, the Cherunivava was the mine *par excellence* of the Jesuits. It occurs about three leagues north-west of San Juan del Rio, and the amount of work done upon it is certainly immense. The vein ores average six feet in width, though in many places they have been worked to a width of twenty feet. It is now impossible to determine the depth of the openings, as the walls of the extensive open cut following the vein along the mountain side have in many places caved, covering the deeper openings. Even where such caves have occurred, however, the cut remains open one hundred feet in depth. Though I here again made diligent search in the waste banks, I could find no pieces of the ore, so carefully had they been gathered; and I could only form conclusions from what was exposed in the bottom of the taho. The wall formations are a diorite, the quartz gangue is an opaque white variety, and the accompanying ores are the chloro-bromide, with native silver and gold—very rich. The vein can be traced into the ravine and the adjoining elevation. Indications of the walls which once surrounded what are supposed to have been the main openings into the mine, and also of the ore-houses and quarters of the guard placed over them, are yet visible.

On the northern end of the hill is a taho quite as extensive as the one already described, but in as dilapidated a condition. It is upon a parallel vein, and in appearance and character is similar to the main mine.

PINAL.

The Pinal, between San Juan del Rio and Cherunivava, and two leagues from the former place, occurs—as do all mines in Mexico—on a mountain side. The course of its vein is north-west and south-east; it has four openings, the deepest of which is now 130 feet, though the inevitable caving has here again taken place. The encasing formation is similar to that of the Cherunivava, with a well defined and strong vein six feet wide. I had the usual success in my search for specimens of the ores, though I determined they were the chloro-bromide and argentiferous galena, with native gold and silver; the ores contain a heavy percentage of gold, which is seemingly the predominating metal of the mine.

GARRIGON.

Half a league nearly due west of the Pinal are the Garrigon mines, a number of excavations of extent, occurring on nearly parallel veins. The principal workings are in the form of open cuts upon the veins, with an occasional vertical opening following the metals down. These mines have suffered severely through the depredations of time, and but little can be determined concerning them beyond that which we can see in their present existing workings. The veins are three to six feet in width, and are regular and strongly defined, and their ores are similar in character to those occurring in the Cherunivava. The invariable accompaniments—a ruined mining reál and banks of scoria from the once existing reduction furnaces—are here; and in their existence is ever presented a reliable evidence of the former richness and prosperity of their mines.

TAHO AND SAN NICHOLAS.

Continuing west, a distance of two leagues from the Garrigon mines, brings us to the equally ancient mines of Taho and San Nicholas. The first named is, as its name implies, a mountain cut, though I was not prepared, even by the very full traditional particulars concerning this mine which I had listened to, to witness such an astonishing, and, I may say, stupendous mining work. Did we not know from the heaps of rubbish everywhere in the vicinity, that this was the work of man, we would conclude that nature had cleft the mountain in twain, forming a huge rent 500 feet deep from the summit ridge, and extending nearly 400 yards in length and entirely through the mountain. There are no means of determining how far below this cut the ancient workings extended, for here also the walls have in places caved, filling the bottom of the cut with debris.

The San Nicholas is perhaps a league distant, and was almost as extensively worked by open cut, the outcrop of the vein occurring high up on the mountain side; it is in a more dilapidated condition, and it was with great difficulty that I could determine the occurrence of its ores to agree in many particulars with those of the Taho. The veins have a course nearly east and west, occurring in a feldspathic porphyry, fine grained, and with peroxide of iron visible. The width of the veins is five to eight feet, though in some places they occur ten feet wide. They are strongly defined, with quartz gangues containing chloride and chloro-bromide ores, accompanied by native silver, and, in places, argentiferous galena, having only a trace of blende. In the San Nicholas is a considerable percentage of gold, and there are evidences that the workings have extended to the black and gray sulphuret ores. I found traces of antimonial sulphuret of lead and silver. At the ancient reál of San Nicholas are the ruins of fifteen arrastres, which would indicate that

when abandoned the more complex ores were being produced from the mine.

CINCO SONORES.

About two leagues from the San Pedro is the Cinco Sonores mine, occurring on the eastern face of the Nacosari mountain, and 700 feet above its base. The vein has a course almost north and south. It was first opened upon by the ancients for its chloride ores, and the original ores were thus exposed within a few feet of the surface. They are the most surprising deposit of ores of the kind, because the most extensive I have ever seen. Where stripped of the chloride, they show a compact metalliferous mass, 38 feet in width and 400 feet in length. The ores are principally the gray copper (fahlerz) and red oxide of copper, accompanied by chlorides, occurring near the encasing walls to a thickness of six inches to twelve inches, and zinc blende in considerable quantities. Yellow sulphuret of copper occurs in conjunction with the red oxide, and the fahlerz is particularly notable for the heavy proportion of silver which it carries. This occurrence of ores must undergo a change in greater depth, either altogether taking the form of a tetrahedrite, or a yellow sulphuret, of which red oxide is the decomposed resultant. The red oxide now predominates, and this would have me believe that yellow sulphuret of copper will prove the vein ore, though the proportional relations of the present existing ores may at any point have a change, and the fahlerz become the predominating ore.

DON JUAN AND LA PLOMOSA.

The Don Juan mine, to the south, is a continuation of this vein, and was also anciently worked for its chloride ores. It presents a similar appearance to the Cinco Sonores, the only difference being that its ores contain a heav-

ier proportion of iron and zinc. The encasing walls of this vein are a highly quartziferous porphyry.

Four leagues from San Juan del Rio, in a course a little south of west, is the mine known as La Plomosa, occurring in a conical mountain. A number of openings occur on the south side of the mountain, and upon the opposite side are others, and from the occurrence of their ores and encasing formations I have to conclude that they are upon one vein. This mine was a frequent resort of the miners from Cumpas, who packed the ores away upon their backs, until, through the death of some of their number by Apaches, the hazardous venture was abandoned. The mine opening penetrates to a depth of 150 feet below the surface, though a portion of it is now filled with rubbish. I am informed by those who visited it when its openings were in repair, that extensive excavations were made in the vein upon either side. The ores are argentiferous galena, and have yielded those who worked them two to three marcs per quintal (of 100 pounds), besides a valuable grata for the more complicated ores. The vein of ores is in some places but six inches wide, in others three feet; its average width is not over a foot, though it is well defined.

I have only mentioned above those ancient mines whose traditional histories were so complete that I could readily recognize them. In the San Juan del Rio property and its neighborhood, however, are many isolated mines of which we have no information beyond that supplied by their own dilapidated excavations—in some cases almost indistinguishable—rubbish banks and scoria piles. These mines present every indication of former prosperity and present merit, though I have refrained from particularly describing each. The country is also checkered with surface appearances of mineral veins yet undisturbed, though carrying the metalliferous particles even in their outcrops, and showing as favor-

able surface indications of mineral wealth as did those which have proven so productive through development.

ADVANTAGES FOR OPERATING.

The mines which I have above described are all eminently well situated for extensive development and economical working. Steam power for hoisting and pumping is superfluous. I have remarked that the veins occurring in the Valenzuello mountain appear in the arroyas on either side, and by running a tunnel upon any of them it would develop them at a depth of 600 feet below their summit outcrop, or, which I believe would be preferable, a tunnel run into the mountain from its south-west terminus would cut the Valenzuello vein in a distance of 150 feet, and, in succession, all the others 300 to 600 feet below the summit outcrop. The three veins of the San Pedro mines may be cut far below their old workings by a tunnel 200 to 300 feet in length. The Rosario could thus be opened, by a tunnel following the vein, 200 feet below the old workings; the Huacal 350 feet below its mouth; the Cherunivava and Pinal by following their veins, perhaps 200 feet; the San Nicholas and Taho a considerable distance below the supposed terminus of their old workings, and the Cinco Sonores 400 feet below its outcrop. And so, I believe, without exception, with the other mines and mineral veins occurring in the property and vicinity.

SULPHURET ORES.

From the fact that in the heaps of slag which we find at every mining reál we have the evidences of the mode adopted by the ancients in subduing their ores, and from the nature of the mine openings, it would seem clear that they had contented themselves with removing only the superior grades of the decomposed ores—those which had undergone a

chemical change through action of the atmosphere, looking unfavorably upon the more complicated ores occurring below the zone of decomposition, either through ignorance of the process for the extraction of their silver, or—what seems more reasonable—from the impossibility of securing the quicksilver necessary. We learn that about the time of the operation of these mines quicksilver rose so high in price ($150 to $170 per hundred pounds) as to virtually place an embargo upon its use. In future operations the grand source of wealth must necessarily be the more complicated because less altered ores (which, however, in the advances made in metallurgy, have, to us, lost their complications); from which will be released riches at least equal to those taken by the Mexicans from the chloridized ores of the surface; though it may be supposed that even in the older and more extended workings, but particularly in the veins which have yet been comparatively undisturbed, there are quantities of the simpler ores which may be cheaply and profitably worked.

An important element of value in these mines is their abundant ores, which, when it occurs (as in the Valenzuello mines), more than commensurates for medium lays, on the principle that many tons of $100-ore will prove more profitable than a single ton of that which may yield $200 to $300. A mine with a limited supply of ores can never prove profitable to a foreign company. The supply here will be limited only by the working capacities for its treatment. The San Patricio would alone be capable of furnishing employment to a 100-stamp mill.

WATER POWERS.

The water powers comprised in the San Juan del Rio property are superior to any others I have seen in Sonora, and the only ones in Northern Sonora which may be made

available in mining enterprises. A water power of sufficient volume is one of the elements necessary to success in mining enterprises in Sonora. Where steam power and its necessarily complicated connections must be called into play, with its attendant expense, I do not hesitate to say that the enterprise runs nine chances of failure to every one of success. And I am borne out in this statement by the widely known career of many affairs here and in Arizona. Complicated machinery is ever liable to get out of repair, to breakage and other mishaps, which, in a country where the machine shop and foundry is next door, causes only a momentary delay; but here, when even the slightest repair is called for, it cannot be made short of San Francisco, and causes a suspension of two, three or four months in operations; and this alone is ruinous. And, again, the expense of getting complicated machinery into the country, (for it must be cast in segments and packed on mules,) the risk of having it broken or portions stolen or lost in the transportation, the need of a practical engineer to attend solely to it, at a heavy salary, and the many other attendant expenses and drawbacks known only to those who have tried the experiment, all will be likely in the end to prove disastrous. The only safe rule of procedure is to use the smallest possible amount of machinery, and have that so simplified in its nature that it may ever be repaired at the mining hacienda, and require only the care of an attentive work-hand. These results, in so far as they relate to a motive power, can only be attained through the application of water power.

The river Yaqui is the largest stream in Sonora, and perhaps the only one which may be deservedly termed a river. It takes its rise in the mountains near the Arizona boundary, and flows in a southerly course through the San Juan del Rio property. It here contains more water than at Oputo or further south, until it reaches Buena Vista, where

it again becomes a strong and rapid stream. During the rainy season it forms a very considerable stream. At the time of our last visit to the property we saw it after months of drouth and when at its very lowest stage, when it formed a rapid running stream of forty feet wide and three feet deep. In its course through the property it falls rapidly, often passing over little falls, and is enclosed in banks of the valley lands. At any point a water power with sufficient head and fall to drive the most extensive machinery may be secured, by damming the stream and carrying the water in a ditch over the bottom lands, or in a flume along the foot of the hills, to any desired locality. Four or five, or even more, of such water powers could thus be secured. There is one principal site with very superior advantages. The northern boundary of the lands was located with a view to controlling the entire waters of the stream. At it, the mountains come close up to the river, forming a narrow and precipitous cañon several hundred feet in depth, through which the waters of the stream take their way. By placing a dam at the lower terminus of this cañon, where the channel is most contracted, bolting it to the cliffs on either side, and to the bottom, a compact cement or concrete impervious to water, a fall of any needed extent may be secured; and, if properly erected, there need not be the slightest danger of the dam being carried away. On either bank of the river are numerous favorable sites for the erection of beneficiating works and mining haciendas.

Besides the waters of the river the lands are plentifully supplied with smaller streams and springs. The water occurring immediately at the Valenzuello mine is impregnated with mineral, though it is not unwholesome; in its immediate vicinity is a mountain spring of very excellent water. The stream of Heurigo cañon is crystal clear and cold, almost ice cold.

TIMBER.

A valuable element in mining enterprises, and one which the western and southern districts of Sonora are very deficient in, is timber of such quantity and quality as may be desired for building purposes and fuel. The timber and lumber used in the erection of the beneficiating and other mining works of most of the American enterprises in Sonora and Southern Arizona, have been necessarily brought from San Francisco, and conveyed to the mines at heavy expense. I have avoided a need for this, in securing within the San Juan del Rio property all of the heurigo timber tract, undoubtedly the most noted and valuable in the State. It is in a valley near the southern terminus of the property and west of the river, and, except to the north, is surrounded by steep mountain ranges. This tract covers an extent of 1,000 or more acres, all of which is thickly studded over with a growth of magnificent trees, three to eight feet in diameter, and gradually tapering in their upward course, until they attain a height of 80 to 120 feet, without perceptible crook or twist. This timber is a species that I have seen in no other part of Mexico, and in fact, nowhere out of Northern Sonora; and though in some of the surrounding cañons are a few trees of it, this is the only tract *of extent* I know or have been informed of. It has some resemblance to bay mahogany, but is of a finer grain and susceptible of a beautiful polish; it is light, pliable, and indestructible as the best varieties of cedar. In late years it has been eagerly sought after for the manufacture of doors, window frames and sashes, the better grades of furniture, and the ornamentation of churches and the private residences of the wealthier classes, and for these purposes has been conveyed to the extreme southern precincts of the State. No stronger evidence of its value and adaptability to the many uses of timbers need we have, than the means adopted in getting it

to the southern towns; it being necessary to drag the logs, cut to a length of eight to ten feet, and attached to oxen, over the steep mountain trails of the country. I consider this an exceedingly valuable timber for all purposes in which timber and lumber may be required; it is eminently suited for the frameworks of large structures, for the beds of machinery and stamp batteries, for the building of dams, and any use which may require heavy and indestructible timber, and it will make a superior class of lumber. In the present condition of the mountain trails, it presents some difficulties in transporting it from the valley in which it occurs to desired localities; these difficulties are not, however, of a serious nature. During many months in the year, the stream finding its way through the very precipitous heurigo cañon contains a large volume of water; and by the expenditure of a small sum in removing drift from its channel, the logs, cut to any required length, may be floated down to the river and secured, from whence they may be conveyed with ease to the desired points. Or a wagon road may be made, with small outlay, from the timber to Joriquipe cañon (from where there is a good wagon road to the river), there being but a single hight to ascend, after which the road follows a gradually descending plateau.

The lands are abundantly supplied with other timbers. On the river margins, cottonwood, ash, willow, walnut, and sycamore of good size and quality abound. On the bottom lands—the lands formerly cultivated—is a dense forest of mesquit, so thickly matted that we were, in places, obliged to cut paths through it. I was surprised to find many of these trees three feet in diameter, as, in other localities, they seldom attain a diameter of more than six or eight inches; and with one exception, this was the most extensive forest of these trees I had seen. In the tributary cañons, and on the hillsides they also occur in numbers, but smaller.

This mesquit timber can not be too highly appreciated as a fuel; it burns long and fiercely, and give an intense heat. It is particularly valuable for charcoal, which I pronounce a superior article. On the hills are several varieties of oak; and on the higher mountain peaks, two or three leagues distant, are heavy forests of pine.

ARABLE LANDS, AND AGRICULTURAL PRODUCTS.

At the southern boundary of the lands, as at the northern, the mountains come up to the river; thus enclosing the bottom lands which stretch between them, and extend out on either side of the river, forming a valley of good extent. I have spoken of the indications which here abound of the former cultivation and productiveness of these lands. This river bottom contains 4500 to 5000 acres of the finest agricultural lands, all of which are so favorably situated, that they may be abundantly irrigated from the river with scarcely an effort, and placed under the highest cultivation. And, in this region, favored with every needed element to success, it is impossible to estimate the variety and value of the crops it is capable of producing; we find, here, the most valued products of the temperate zone, with the most needed of those of the tropics. Two crops are raised from off the same land in the year, and their yield is so abundant, as to occasion astonishment to those who are unacquainted with the productive nature of these soils. The rainy season sets in early in June, and continues to October, though occasional showers fall until March. Corn, and other products which require rains to bring them to maturity, are planted in June; and in the latter part of November, or in December, wheat and other hardy products follow; though where, as on these lands, irrigation may be resorted to, the crops, however planted, are ever sure. The wheat of Sonora is very superior in quality; its yield is one hun-

dred to two hundred bushels to one bushel sown, and it is not uncommon to get two hundred and fifty to one. Corn yields large crops; the native variety is a white flint, and may be advantageously replaced with our American Yellow, and other varieties. Peas ever produce three abundant crops in the year. Beans are the favorite food of the people, and, as they grace alike the table of rich and poor, surprising quantities are consumed. I saw neither rice nor barley, though both may be successfully cultivated. These lands are eminently adapted to the cultivation of sugar cane, cotton and tobacco, which are raised in the nearest settlements with excellent results. From the sugar cane, a coarse kind of sugar, called *panoche*, is made by the natives; it is a favorite article of consumption, and finds ready sale at $25 to $40 the carga of 300 pounds, which leaves a handsome profit to the cultivator. Cotton is one of the most profitable products of the soil, and is becoming extensively cultivated. The staple is shorter than our cottons, though of good quality; it is manufactured by the native women into articles of wearing apparel. Tobacco also yields well: it is a profitable crop, and is becoming extensively cultivated. Besides these, Chile pepper—a capsicum of great pungency, and one of the necessaries of life with the natives—onions, garlic, melons, and sweet potatoes are produced, and our common potato and vegetables may be successfully introduced. Fruits of excellent quality could be grown, especially sweet and sour oranges, figs, quinces, and peaches; and the grape could not fail to be a decided success. Besides the valley lands on the river, are those of the heurigo valley comprised in the timber tract already spoken of; they are exceedingly fertile, and may be irrigated from the creek which courses through them. Back from the river are several plateaus of rich soils, containing in all, perhaps, 500 acres, which, while they are too elevated to admit of irriga-

tion, would produce abundant crops of corn in the rainy season.

The only farming implements of the country are a pointed stick—serving for a plough—a hoe, and a sickle; and where such grand results are attained with these, what would not be the results of the introduction of our improved agricultural implements, and the application of farming knowledge?

PASTURE LANDS.

The pasturage, though not so abundant as is found to the north-west, is yet very superior. The higher lands, unfit for agricultural uses, but covered with a growth of nutritious grasses, are adapted to cattle and sheep ranges. There are three varieties of grasses upon the lands—the mesquit grass, confined to the ranges of the mesquit timber; the sacatom, a coarse species found on the higher ranges; and the gráma [*crondosium*] occupying the plateaus and less elevated hills. The latter variety has much the appearance of dry, curled whittlings of pine wood, is very nutritious, and was greedily eaten by our animals. Throughout the entire year the cattle graze upon the hills, there being no need to preserve the grasses. Northern Sonora is, without dispute, pre-eminent as a stock raising country.

ROADS.

The roads are principally the simple pack trails of the country. From Guaymas, the port of entry, a good wagon road passes by way of Hermosillo to Ures, and thence up the Sonora river to Arispe, twenty leagues from your property, which distance is traversed by a good pack trail. A very excellent wagon road from Guaymas, passes through San Marcial and Matape, and with very small outlay, may be opened almost to San Pedro, by way of Oposura and Cumpas. From San Pedro a pack trail crosses the moun-

tain range to Joriquipe Pueblo, a distance of three leagues, from whence a natural wagon road continues to the property. I think, however, that packing may be altogether avoided, and a wagon road found to connect San Pedro and Joriquipe, by using a mountain pass a little farther north, which, it is said, was used by the Jesuits for this purpose. A road could be opened, though at considerable expense, from Oposura to Granadas, on the Yaqui river, from whence a good road continues north to the property. A road could also be opened from the mouth of the Yaqui river; though the preferable route of all, because the shortest and least expensive, is that by way of Oposura, Cumpas and San Pedro. In the meantime, the pack trails connecting the property with the lower towns could be materially improved by the expenditure of a few hundred dollars. A wagon road for the transportation of ores from the Valenzuello mines to any desired point on the river, may be made; also one from the heurigo timber tract to the river, as I have already remarked. The natural wagon road up Joriquipe creek may, I think, be connected with the Cherunivava and Pinal mines; and, if continued through the pass mentioned above, with the other mines spoken of in this report. The pack trains and wagons conveying bullion, agricultural and manufactured products, etc., to Guaymas and the southern towns, would return laden with salt, quicksilver, and other needed supplies.

LABOR.

The substitution, *in toto*, of white labor for peon, would not, during the existing rates of compensation, be advisable. The Mexican labor, though, under the most favorable auspices, of no very high standard, may, when properly superintended, be used advantageously, though, to render it controllable, the system of peonage must be continued.

More, however, depends upon *proper management* in this matter than, perhaps, in any other connected with operations in this country. The Oputo Indian labor is preferable to Mexican, being more pliable. These Oputo people are docile and intelligent, have wonderful powers of endurance, and make good miners and laborers; and withal, they manifest a strong feeling of friendship for the whites, in which, they are diametrically opposed to the Mexican, who, on every *safe* occasion, shows treachery and deceit. Strictly speaking, the Oputos form the producing population of Northern Sonora. The price of labor is governed here, as elsewhere, by the demand; the pay of miners and laborers rarely exceeds fifty cents per day.

SUB-DIVISION AND COLONY.

The lands of San Juan del Rio may be advantageously sub-divided into several or more tracts, each having water-power, arable lands, timber, pasturage, road facilities, mines, mineral veins, etc., to make it, in every sense, independent of the others.

They are also eminently adapted for a colony or colonies, having every needed element within their boundaries to support and give employment to a considerable population. In consequence of the abundance of water-power, fuel, and arable lands, it is a favorable site for manufacturing establishments, cotton, flour, saw, and sugar mills, etc. The manufacture of cotton goods and woolen fabrics could not fail to be a success, as in the northern towns such goods—of which a supply is never to be had—find rapid sale at 100 to 300 per cent. over the ruling prices in Guaymas and Hermosillo, which, in their turn, are 50 to 100 per cent. higher than their cost to the merchants. And the same rule applies to all manufactured articles.

The climate of this portion of Sonora is truly delightful,

the thermometer seldom rising above 80° or falling below 50°; and its healthfulness, serenity, and equability, surpass those of any other spot I have ever visited.

APACHE AND CIVIL WAR FEARS.

The success of myself and assistant in traveling, with but two servants—whom we were obliged to watch—through almost every portion of the Apache country, and in carrying our investigations into sections which have not before been visited for half a century, or more, is, I think, an ample proof that the Apaches will not be a serious obstacle to an extensive mining establishment on the San Juan del Rio property. I would not wish to infer that there are no dangers, or that it would be advisable to adopt a course of action which we were forced, through circumstances, to follow; that would be extremely hazardous, and the result almost positively fatal. It is true, however, that nearly every disaster that has occured through Apaches, may be traced to recklessness or a criminal neglect to adopt such precautionary measures as common sense would dictate. The principal dangers are those which are encountered in traveling from point to point; and even these may, in a degree, be avoided by caution. An active mining est blishment, when taking common precautions against surprise, incurs no danger from even the strongest party of Apaches; it is only when vigilance is relaxed, and there is supposed to be no danger, that it really occurs. The cunning strategy, and even courage of the Apache must not be despised; and on the other hand, he must not be feared. When met with his own safeguard—which is an ever active watchfulness—he is conquered.

No interference from the contesting parties in Sonora, Liberal and Imperial, need be apprehended, while your representatives strictly confine themselves to their duties, and do

not interfere with the social and political institutions of the country. The only annoyance you may be subjected to, are vacillation and delay in business matters, and petty tyrannies in passing through their army lines; and patience and civility, marked by firmness, will, in a majority of cases, overcome these. A show of strength, and determination to deal severely with offenders, will be sufficient to check marauding parties.

ORE SAMPLES.

I was subjected to one of the annoyances above named, in not being permitted to take with me, through the army lines, specimens of the ores of the mines I have above described. On my first visits to them, I carelessly gathered a few specimens of ores from the debris banks of several of them, without reference to their merit, as sample specimens, and carried them to Guaymas, expecting, however, on my return, to collect ample specimens from all the mines. This I was deterred from doing through the above prohibition.

GENERAL CONCLUSION.

In describing the ancient mines of the San Juan del Rio property and its vicinity, I have confined myself strictly to the results of my own investigations, which were conducted without listening either to suggestions or explanations from any one. It is now but simple justice to remark that these mines have a fame, through tradition, and from the statements of the best people in the country, for former extent and richness, which is scarcely equalled, assuredly not surpassed by any in Mexico. When it is remembered that a great part of these mines have not been worked for over 120 years, that all have been abandoned for 60 years, and that but few who were acquainted with them were survivors of their activity, it might readily be supposed that however

great their fame, it would, long since, have been forgotten. This is not so. In the most distant part of the State their worth is remembered, and the most respected citizens testify to their superior richness, in terms of the most unqualified praise. And—a fact by no means frequent in Mexico—the statements of all whom I have heard speak of these ancient mines, are strongly corroborative, which would indicate that the information from which they speak, is drawn from a reliable source I would, perhaps, place but little credence in the traditions of the extent of these mines and richness of their ores, or in any of them, were not their truthfulness in many instances established through my own investigations. In fact, these traditions, and the statements I have heard, display a wonderfully correct knowledge of the extent of the workings, richness, and nature of the ores, and other minutia; and if so correct in these, are they not likely to be equally so in the matter of their former yield? And I simply agree with them, without desiring to do so, when I remark that the results of my investigations into these mines, have impressed me with the belief that they are exceedingly valuable, have every required facility connected with them for extensive and successful operation, and, if placed under proper management, can not prove otherwise than profitable.

I consider any single mine of those I have named, sufficiently extensive and meritorious in itself to warrant the careful and sole attention of a mining association.

I was disappointed in not finding among the archives of the State, the government reports of the condition and yield of these San Juan del Rio mines during their operation. Before their removal from Arispe, the former State Capital these returns, and indeed a great part of the documents, were pilfered or destroyed, it is supposed, during one of the many internal strifes. Several worthy gentlemen who saw

the returns, inform me, however, that the yields, as represented, were immense—too large, perhaps, to bring credence with them at this late day.

I present, herewith, certificates from a number of responsible gentlemen, and some documentary extracts.

Very Respectfully,

CUMMINGS CHERRY,

Geologist, and Mining Engineer.

JAMES CHERRY, *Assistant Geologist.*

PITTSBURGH, PENN., August 13, 1866.

[TRANSLATION.]

MOCTEZUMA, May 12th, 1866.

Having stated voluntarily to the Señor CHERRY my belief that the lands of San Juan del Rio were very important lands, I give in this such positive and admitted truths as are known. They are situated on the margins of the Yaqui river, and present a beautiful valley, with lands of a superior quality, and well adapted for agriculture. In the main valley are extensive timber tracts, of the classes following, viz: Mesquit, in great abundance; grand groves of the timber known by the name of Heurigo, and extents of other woods and shrubberies, of large growth and valuable, which stretch from the river to the highest sierras. They have excellent waters, abundant pastures of the best varieties, to the loftiest points, and their soils are very superior. Respecting the minerals, they are the most abundant of any I know. The principal ones are those of the sierra known as "Valenzuello." The sierra immediately to the north east of it has not been explored, but, according to the information we have of it from the ancients, it contains many rich minerals. All of the hights on either side of the river have numerous and exten-

sive mines, excavations and openings upon them, which were made by the old inhabitants.

With respect to the ranche of Nacosari, which is the most immediate to this pueblo, it is situated in a cañon well supplied with water. This cañon presents bottom lands suitable for agriculture, and very excellent. On either side of the cañon are extensive pastures of very superior quality; the lands are spacious and very beautiful. A sierra to the east of the cañon has large tracts of pines, and the lower lands also possess good timber tracts, and in great abundance, such as fresno (ash), alizo (alder), alamo (poplar) and, in various parts, heurigos. In respect to the minerals, they are abundant. To the east and north-east is the *mineral* (district) of San Pedro, the mine of the Rosario, and many others whose names are not now known; to the west is the grand mine of Cinco Sonores, the mine of San Juan, and others whose names are not known; to the north, and in the neighborhood of the ranche, is the real of Cherunivava.

All these mines and the ranches have been abandoned for so many years that they have ceased to have owners, and the houses which were on the ranches have crumbled into ruins.

These ranches (San Juan del Rio and Nacosari) are the most valuable we have in the District. Such is my belief and the voice of the people in general.

[Signed] AUG. MA. MONGE.

NOTE.—Notwithstanding I, the priest and Cura of this parish of Moctezuma and its surrounding pueblos, have affirmed to the above without having personally seen the lands, yet the above declarations are the unanimous belief and expression of the people. To which I affirm. [PRIVATE SEAL OF CURA *of Moctezuma District.*]

And we certify that the above statements and descriptions are truthful and correct, and annex our signatures.

RICARDO REVERE, [*Alcalde of Cumpas.*]
JESUS DURAZO, [*Judge of Moctezuma District.*]
ANTONIO TIMBRES,
ROMAN PERALTA,
JOHN EGLESTON, } *Former Liberal Officials.*

I, Commissioner Municipal, certify to the truthfulness of the statements in the above letter. ANTONIO HOYES.

ANTONIO TERAN Y BARRIOS, *Sub-Prefector and Military Commandant of the District of Hermosillo.*

I certify in truth and power of my office that the declarations in the above letter of the Señor Cura MONGE and other subscribers are very positive and correct in all their statements relative to the mentioned lands of San Juan del Rio, etc., and for the use of the interested I make this affirmation, on the date, in this city, May 21st, 1866. TERAN Y BARRIOS.

The document from which the following extract is taken bears date 1764, and is one of a collection of documents written by the Jesuits between the years 1634 and 1774, and relating to the mines and missions of Sonora. These documents were compiled by Friar FRANCISCO FIGUERO, and published in the City of Mexico in 1792, and it is from this work that I make the extract. I have translated it from the Spanish in which it originally appears :

"Fourteen leagues to the north of Cumpas is the ancient reál of Nacosari, which from being very rich has been reduced by the hostilities of the Apaches to little more than one resident, with a few of his armed people and some Oputos. It has numerous and rich mines in all directions, but their working has been much interfered with because of the dangers to which the laborers were ever exposed from the Apaches. To the north there were two other reáls and that of Cherunivava, five leagues distant, with a mine of the richest character of both gold and silver; the lay of gold is not heavy; the yield of silver is three to four marcs to the arroba (of 25 pounds), the dirt heaps yielding this amount after the abandonment of the mine, which occurred on the 5th of March, 1742, on account of the Apaches having assaulted the neighboring reál of Aguaje. This reál was afterwards maintained until 1744, when being a second time assaulted by the Apaches, who killed a number of its people and burned its houses, it has remained abandoned until the present day. So, also, has the old reál of Nacosari since 1742, for the same reasons, and the reál of Peña, about two leagues south-west of Nacosari, and that of the Hacienda Vieja, a similar distance to the east. Four leagues north-west of Nacosari is the reál of Garrigon, with mines of gold and silver nearly pure, which were all abandoned

some years before, because of the cruelty of the Apaches, and not from want of ores, which the mines of this district have with large lays. I am assured by Vasquez, above mentioned, that many of these mines gave 75 mares of silver per 100 pounds of ore, and, among others, was that of the Pinal, of silver and gold nearly pure, and that of the Huacal, though they are somewhat distant (from Cumpas, and consequently nearer San Juan del Rio). Not far distant from the Pinal was formerly the old town of Toapatz, afterwards the mining real of San Juan del Rio, depopulated because of the same enemy, with another near Oputo, called the Nori."

GAMBOA'S CATALOGUE OF MINES.

I have not now within reach the catalogue of the mining districts in Mexico, compiled and published in connection with commentaries upon the Spanish mining laws, by Gamboa, under the royal favor, in 1761; though I remember very distinctly that he awards to the mining district controlled by your property *as great commendation* as that given to any other district in Mexico.

COL. BOURNE'S REPORT.

Colonel BOURNE, an English gentleman, journeyed through Sonora in 1826 and 1827, with a view to examine into its mineral features, and secure reliable information of its mines. The following is an extract from his report:

In traversing these mountains (Nacosari and San Juan del Rio) you meet with many excavations, but the principal mine, called San Pedro de Nacosari, is a phenomenon. The vein runs east and west, and is laid open from the surface more than one thousand varas to the depth of seventy varas; the breadth of the aperture is about two yards, but on each side are immense quantities of rubbish thrown out. Much dirt and sand have washed in and covered the vein; but general report says that the mine has no water in the interior, and that the ores were so rich that the best yielded from 25 to 30 mares of silver for 25 pounds of ore.

The mines of Cherunivava, Pinal, Huacal, Aguaje, and many others, are situated to the north and north-east of Nacosari, at no great distance from San Juan del Rio, built upon a stream which falls into the Yaqui. These minerals are equally rich with those

already described. Pinal contains a greater proportion of gold than silver. It is recorded in the archives of Arispe that the former owner, a lady, by name Maria Quijada, lent at one time 700 marcs [about $60,000] of gold for the use of the Government.

Cherunivava is a very old mine, worked in the same way as San Pedro; as indeed are all the mines in this part of the country. The direction of the vein is east and west, the breadth two varas. The last persons who undertook to work these mines were three men by the names of Escalante, Vasquez and Caulla. They cleared away the rubbish at one end until they found a pillar left to support some of the old workings, from which they took ores that produced $70,000, and yielded seventy marcs of silver per carga of 300 lbs. Not immediately finding the principal vein, they divided the money and discontinued their works. The mine is laid open from the surface 400 yards in hight. Tradition says that the first discoverers found the vein of virgin silver half a vara in breadth; that it was abandoned in the Apache war, with the vein, as described above, two varas, and ores of seventy marcs per carga. The richness of these ores appears almost incredible, but when we consider the great quantities of bars of silver that Sonora has produced without the aid of quicksilver, the metals must have been very rich and abundant.—*Ward's Mexico, pp.* 578–9, *vol.* 2.

WARD'S MEXICO.

The most authentic work published concerning the mines of Mexico is undoubtedly that entitled "Mexico in 1827," by H. G. Ward, British Chargé d' Affaires in that country during the years 1825, '26 and '27, from which I take the following. Mr. Ward had occasion to travel, in the discharge of his duties, over a large portion of the country, during which he secured invaluable data concerning the mines of Mexico and their former product, not attainable before or since:

"That the great mineral treasures of Mexico commence exactly at the point where Humboldt rightly states the labors of the Spaniards to have terminated (about latitude 24°), is a fact now universally admitted by the native miners, although hitherto but little known in Europe.

"In order the better to illustrate it, I shall beg to subjoin some details, which I was enabled to collect during my journey into the

interior, premising that I have the evidence of registers of produce and official documents for every fact that I submit to my readers (some of the least voluminous of which I subjoin), and that I have adopted nothing upon mere verbal report.

"The States of Durango, Sonora, Chihuahua and Sinaloa contain an infinity of mines, hitherto but little known, but holding out, wherever they have been tried, a promise of riches superior to anything that Mexico has yet produced. These districts are distinguished not less by the superior quality of their ores than by the circumstances of their beginning to be productive within a very little distance from the surface (usually from ten to fifteen yards); whereas the Veta Madre of Guanajuato yields little or nothing until the depth of eighty yards is attained. The metals seem to increase in richness as you approach the north; insomuch that in the reál or district of Jesus Maria, in that great branch of the Sierra Madre which separates the States of Durango and Chihuahua from those of Sonora and Sinaloa to the north and west, the ores of the mine of Santa Juliana, which does not exceed seventy yards in depth, appear, by a certified report from the Deputation de Mineria now before me, to average seven and eight marcs of silver per carga of three hundred pounds, which is the average produce of ten cargas of good ore in Guanajuato; while ores of the best quality yield as much as from four to ten marcs per arroba of twenty-five pounds, or forty marcs per carga."—*Pp.* 124–8, *vol.* 2.

"Without entering into similar details respecting each of the other districts mentioned in the table of northern mines, it will be sufficient to state that, with some few exceptions, they all possess, in a greater or less degree, the same advantages—richness of ores and veins productive almost at the surface; that few have been worked to any extent; and, consequently, that the risk of making the necessary experiments there is trifling in comparison with the immense outlay required by the old mines of the southern districts, which have, in general, attained an enormous depth."—*P.* 131, *vol.* 2.

"I must, however, remark generally, that Mr. GLENNIE'S (an experienced English mining engineer) views with regard to the riches of the Sierra Madre (which he terms *one mine* from Guarisamay to Jesus Maria) coincide entirely with those entertained by Colonel BOURNE; and that the opinions of both are confirmed by all the Mexicans who have visited the internal provinces; by the official documents frequently alluded to in the foregoing books; and by the

unanimous evidence of a number of most respectable individuals whom I had an opportunity of consulting myself upon the subject, at Durango and elsewhere."—*P.* 606, *vol.* 2.

In mentioning the mines on the San Juan del Rio property and controlled by it, he remarks that they are

"In a position possessing great local advantages—a fertile country, the vicinity of two large rivers, and a communication by water with the Pacific. The mines themselves were formerly celebrated for their riches, and the capital required to bring them again into activity is very small. The specimens which I have seen of the ores extracted from them almost induces one to adopt the theory that the proportion of silver contained in the ores increases as you advance toward the north—a theory which is very generally believed at present in Mexico, and which is certainly confirmed by the superiority of all the northern ores to those of the richest districts in the south."—*P.* 136, *vol.* 2.

Again he remarks:

"The most noted are the mines of San Juan Bautiste de Sonora (situated upon a mountain eight leagues to the north-west of Oposura, which is crossed in different directions by fourteen veins, all distinctly pronounced,) and those of San Pedro, Nacosari and Cherunivava (to the north and north north-west of Oposura).

"In all these districts the depth of the mines is inconsiderable, their former riches acknowledged, and the causes by which their working was interrupted known. The advances necessary in order to bring them into activity are small, for in fact it is more remittances and mining stores (which must be sent around Cape Horn to Guaymas) than money that is requisite.

"I am aware that many of the statements contained in this and the preceding books, respecting the mineral riches of the north of New Spain, will be thought exaggerated. They are not so; they will be confirmed by every future report; and, in a few years, the public, familiarized with facts which are only questioned because they are new, will wonder at its present credulity, and regret the loss of advantages which may not always be within its reach."—*Pp.* 599–600, *vol.* 2.

WILSON'S MEXICO.

The following extracts are taken from "Wilson's Mexico," published in 1856:

"Chihuahua and Sonora are the States or departments to be affected by our Pacific Railroad. Sonora is the most valuable of the two, not only on account of its inexhaustible supplies of silver, but also on account of its delightful climate and agricultural resources. It is like the land of the blessed in oriental story. California does not surpass it in fertility or in climate. With industry and thrift it could sustain a population equal to that of all Mexico. The table-lands and the valleys are so near together that the products of all climates flourish almost side by side.

"But it is the remarkable abundance of silver which distinguishes it above all other countries except Chihuahua. I have described in a former chapter the long and laborious processes by which silver is produced from the ore in the southern mines, and also the great depths from which it is raised. In Sonora silver is most commonly extracted from the ore by the simple process of fusion. If we should adopt the theory that veins of ore extend through the entire length of Mexico, then I should say that they "crop out" in Sonora, or, rather, that the silver lodes which are here above the surface dip toward the City of Mexico and also northward toward California."—*Pp.* 383-384.

"A hundred years have passed since the once formidable Apaches swept over Northern Sonora like a deluge, blotting out forever the hopes which the Spanish Court had conceived of retrieving the fallen finances of their empire from this *El Dorado*. But Providence had ordered it otherwise. The Spaniards had done enough to demonstrate its inexhaustible wealth, and then they were driven away from this "creation of silver," and the whole deposit held for a hundred years in reserve for the uses of another race, who were destined to overrun the continent."—*P.* 389.

"Such is Sonora, a region of country which combines the rare attractions of the richest silver mines in the world, lying in the midst of the finest agricultural districts, and where the climate is as attractive as its mineral riches. But its richest mineral district is near its northern frontier."—*P.* 388.

HISTORY OF TITLE.

CINCINNATI, AUGUST 20, 1866.

To the Members of the Cincinnati Land and Mining Association of Sonora, Mexico:

GENTLEMEN:—Before buying of Mr. CHARLES DENMAN the Grant of Four Leagues of Land issued to him in 1857, by COMONFORT, the then President of the Mexican Republic, I secured the legal opinion of my Attorney in New York city, that the Grant was a valid one, and binding on any subsequent Government of Mexico.

Soon after that, in 1858, I visited Ex-President COMONFORT and his Secretary when in New York; and they assured me that it was issued for a valid consideration, and was binding on the Government of Mexico.

On September 30, 1860, my said Attorney made further and direct inquiry of the Mexican Government, through its Consul at New York, Mr. J. M. DURAN, as to its validity; to which the Mexican Minister of *Relaciones* [Secretary of State] replied by official letter to the Consul, "That the Grant made to Mr. CHARLES DENMAN is good, since at the date on which it was made the Government of COMONFORT was in power *(dictatorial.)*"

Soon after purchasing it I forwarded a true and certified copy to Gen. LEWIS CASS, then Secretary of State of the United States, to be filed in his Department, as will appear by the Official Copy of the same, certified to by WM. HUNTER, Acting Secretary of State, of June 7, 1865, published herewith.

In July, 1865, at your instance and for your account, I gave a Power of Attorney to Mr. CUMMINGS CHERRY, to locate the Grant. In January, 1866, he presented the original papers to Governor PESQUEIRA, present Liberal Governor of the State of Sonora where it was to be located, for his decision as to its binding force. He pronounced it valid; and said if the Maximilian Government should refuse to recognize it, his Government, when again in power, would recognize it; but advised, as Maximilian's Officials were in power in Sonora, that he locate the Grant by their authority. This has been done promptly, and without the least exceptions to it; as will fully appear by the report of their official action (*translations*) herewith published—the originals thereof, in all cases, being upon stamped paper and duly sealed.

EDGAR CONKLING.

UNITED STATES OF AMERICA.

DEPARTMENT OF STATE.

To all to whom these presents shall come, Greeting:

I certify, That annexed is a true copy of papers transmitted by Mr. EDGAR CONKLING on the twenty-ninth of September, one thousand eight hundred and fifty-eight, and received on the day following at this Department, where they are yet on file; and that the certificates thereto in the Spanish language, with seal attached, are to all appearances genuine originals.

In testimony whereof, I, WILLIAM HUNTER, *Acting Secretary of State of the United States*, have hereunto subscribed my name and caused the seal of the Department of State to be affixed.

Done at the City of Washington, this seventh day of June, A. D. 1865, and of the Independence of the United States of America the eighty-ninth.

W. HUNTER.

Ministry of Fomento.
Colonization, Industry and Commerce,
of the Mexican Republic.

After presentation to *His Excellency* the PRESIDENT OF THE REPUBLIC, of your solicitation, asking a concession of Four Square Mexican Leagues of untitled Lands that may be found in Sonora, he has been pleased to grant the same, with the understanding, that it shall be for your account to ascertain and designate the place where said Lands exist. You to cause the same to be measured, and the boundaries drawn, by a competent surveyor, who shall form its corresponding plan and description.

That after this being done, it shall be sent to this department, in order to obtain the corresponding Title of Ownership. According to the order of the Supreme Government, I advise you for the corresponding effect as the result of your above mentioned solicitation.

God and Liberty! Mexico, March 27, 1857.

SILICEO.

Mr. CHARLES DENMAN.

The undersigned 1st Chief Clerk of the Ministry of Foreign Relations:

I hereby certify, that the signature at foot of foregoing official document is that of MANUEL SILICEO, Minister of Fomento, Colonization, Industry and Commerce of the Mexican Republic, and the same used in all documents that he authorizes. Mexico, April 22d, 1857.

LUCAS DE PALACIO Y MAGAROLA.

REPUBLICA MEXICANA, DEPARTMENT OF STATE AND FOREIGN RELATIONS.
Official.

LEGATION OF THE UNITED STATES IN MEXICO.

The undersigned, Envoy Extraordinary and Minister Plenipotentiary of the United States to Mexico, hereby certifies, that the foregoing is the signature of LUCAS DE PALACIO Y MAGAROLA, Chief Clerk of the Department of Foreign Affairs of the Mexican Republic.

JOHN FORSYTH.

Numº. 158. Regdo. á fl. 31 del Libro respº. Dros $5 (cinco.)

CONSULADO MEXICANO en N. YORK.

Certifico: que las anteriores copias lo son á la letra de los documentos originales presentados á este Consulado, y los cuales han sido traducidos del idioma Castellano al Ynglés por el que subscribe.

Y para que conste espido el presente certificado en Nueva York, á 28 de Setº. de 1858.

{ SELLO. }

J. M. DURAN.

Know all men by these presents, that I, CHARLES DENMAN, of the City of New York, in consideration of the sum of Twenty Thousand Dollars to me paid by EDGAR CONKLING, of the City of Cincinnati, and State of Ohio, have granted, bargained, sold, and assigned and transferred unto the said EDGAR CONKLING, all my right, title and interest in and to Four Sitios (or Leagues) of Land, situate in Sonora in the Republic of Mexico, to be selected by my said grantee, out of the untitled lands of said Republic, in the said State of Sonora, in conformity with the grant of the said four leagues of land made to me by the said Republic of Mexico, bearing date the twenty-seventh of March, 1857, of which the following is a copy, the original being hereto annexed, viz.:

" Dada cuenta al E. S. el Presidente de la Republica con la solicitud de V. contrahida á que se le concedan cuatro sitios de ganado mayor—de los terrenos baldios que haya en Sonora se ha servido acordar de conformidad, bajo el concepto de que será de cuenta de V. señalar el lugar donde existan tales baldios, destinandolos judicialmente y midandolos por medio de un perito que forme el plano y description correspondiente. Que concluidas estas dilgencias las remita á esta Secretaria para que se le espida el titulo de propriedad correspondiente. Lo que de orden Suprema digo á V. para los efectos correspondientes como resúltado de su mencionada solicitud.''

Dios y Libertad! Megico, Mzo. 27 de 1857.

(Signed) SILICEO—Rubrica.

And I, the said CHARLES DENMAN, do also assign, sell and transfer to the said EDGAR CONKLING, the grant above recited, and authorize him and his legal representatives in my name or otherwise, to locate, select and take possession of the lands in said grant mentioned, and to receive all proper deeds, patents and grants therefor, and to hold said lands to his own use forever; and to convey the said lands with like effect as I could do had I located the same, and these presents had not been executed; with power also to my said grantee to assign the said grant and to substitute his assign as my attorney for the purpose of locating and conveying said lands.

In witness whereof, I have hereunto set my hand and seal at the city of New York, the ninth day of March, in the year of our Lord one thousand eight hundred and fifty-eight.

CHARLES DENMAN. { SEAL. }

Sealed and delivered in the presence of } J. P. WINGATE, CHAS. T. MORSON, CHAS. A. RAPPALLO.

United States of America, State, City and County of New York. } ss.

Be it known that on the ninth day of March, in the year one thousand eight hundred and fifty-eight, before me CHARLES A. RAPPALLO, a notary public duly commissioned and sworn in and for the State of New York, dwelling in the City of New York, personally appeared Mr. CHARLES DENMAN to me personally known,

and he executed the foregoing instrument in my presence, and in the presence of JONAH P. WINGATE and CHARLES T. MORSON, the subscribing witnesses, who signed their names as witnesses in my presence.

In testimony whereof, I have hereunto set my hand and seal of office the day and year last above written.

{ Charles A. Rappallo, Notary Public, New York. }

CHARLES A. RAPPALLO,
Notary Public.

MEXICAN CONSULATE
IN NEW YORK.

No. 127.

Regis^{d} at p. 28 of corresp^{s} book Fees $2.

I hereby certify that the signature of Charles A. Rappallo, who it appears authorized the present document, is that of a notary public of this city; and that the same, as well as the accompanying seal, is entitled to full faith and credit.

In testimony whereof, I hereunto set my hand and seal of office, in the city of New York, this (10th) tenth day of March (1858) one thousand eight hundred and fifty-eight.

J. M. DURAN.

{ Consulado Mexicano in New York. }

CONSULADO MEXICANO EN N. YORK.

No. 159.

Reg^{do} á f^{l} 31 del lib^{o} resp^{o} Dros 5$ (cinco.)

Certifico: que las anteriores copias lo son á la letra de los documentos originales presentados á este Consulado, y los cuales han sido escrupulosamente comparados y traducidos por el que subscribe del Castellano al Ynglés, la parte que lo requerìa.

Y para que consto espido el presente certificado en Nueva York, á 28 de Set^{e} de 1858.

J. M. DURAN.

{ SELLO. }

Principal Office of the Department of Sonora, No. 2621, 2d Class.—3d Seal—50 cents. Qualified for 1866 and 1867. Ures, January 1st of 1866. *Francisco N. Lòpez.*

Señor Sub Prefector of this District:—

Cummings Cherry, a native of Scotland, Citizen of the United States of America for thirty years, and resident in Sonora for two months, appears before you, and, in the customary form, says: Because of a concession decreed by his Excellent Señor, the President of the Republic in office on the 27th of March of 1857, and other documents thereto annexed, and the Power of Attorney which I return, showing that I am entitled to own four square leagues of the public estate of Sonora, I have chosen—in accordance with the terms of my concession, and have found abandoned and deserted—the lands which were comprehended in the ancient ranche of "San Juan del Rio," and I make of these proper denouncement according to law, and have measured the same as follows, viz.: Commencing at and running easterly from the junction of "Joriquipa" cañada with the River a sufficient distance to include within the measurement the "Valenzuela" and "San Patricio" Mines; and thence running from this point southerly and westerly, a sufficient distance to include within the measurement the "Cañon de los Heurigos," this measurement to accommodate itself in form so as to include the desired lands.

In the duties of the office in your charge, you will order the publication of this denouncement in the Official Periodical of the Department, to the end that if there are any persons who have just claims to the lands which I ask for, they may present themselves to prove the same within the legal period of time which you will designate; and if no claimants appear, nor no legal claims to the property be presented, in the legal period of time, I ask that the above described lands be awarded to me, as a step prior to the Official measurement and other procedures legal and proper to give me title in accordance with the conditions of my grant; consenting to pay such necessary costs and expense as may be incurred in placing me in possession of these lands.

Through right of property, and not from malice, I do that which is necessary, etc.

CUMMINGS CHERRY.

Moctezuma, January 31, 1866.

Imperial Mexico.
Sub-Prefectura of Moctezuma,

FEBRUARY 5th of 1866.

For the presenter and claimant I transmit a copy of the original denouncement to the Señor Editor of the "Periodico Oficial" of the Department, in order that, if it pleases, it may be inserted in its columns, to the end that any persons who have just claim to the land denounced may present it as evidence before this Sub-Prefectura, within the period of thirty days; in the knowledge that if they do not benefit by this, I will adjudge the expressed lands to the denouncer, as a prior step to other legal and proper procedures.

The Sub-Prefector of Moctezuma in this manner determines, and affixes his signature.

GREGORIO MORENO. {SEAL.}

Imperial Mexico.

GREGORIO MORENO, Sub-Prefecto of the District of Moctezuma, Certifies in correct form, that on this date is concluded the period of time for the announcement in the "*Periodico Oficial,*" for the benefit of those interested in the lands of Nacosari and San Juan del Rio, denounced by the foreigner, CUMMINGS CHERRY, who is now present, for a decree to him of his just claims. I certify, also, that to the lands of San Juan del Rio, there is one opposition for the Señora Dona JOSEFA TINOCA, residing in Ures, inserted in the "Periodico Oficial." Concerning the lands of Nacosari I have received no opposition; *neither has there been presented any titles or just claims to the lands of Nacosari and San Juan del Rio.* Finally, by desire of the Señor CHERRY, I give this certificate in Moctezuma, the 16th of March, of 1866.

GREGORIO MORENO. {SEAL.}

Imperial Mexico.
Sub-Prefectura of Moctezuma.

MOCTEZUMA, March 16, 1866.

The American citizen, CUMMINGS CHERRY, by concession of the General Government, in the time of the Señor COMONFORT, for four leagues of the public estate in such locality as the interested might select in Sonora, and in accordance with the conditions thereof, denounced before this Sub-Prefectura the lands of "Nacosari" and "San Juan del Rio" in this District, and requested the publication

of these denouncements in the Official Periodical of the Government, to the end that such persons as might consider themselves possessed of just title to these lands, might present them as evidence to this effect, before the Sub-Prefector within such reasonable period of time as might be settled upon.

I decreed upon these denouncements, in conformity with the request of Señor CUMMINGS CHERRY, an order to the interested in the denounced lands, to appear within thirty days, and present and prove any rights which they may claim to possess; and during this period of time, the notices were published three successive times in the "Periodico Oficial." At the expiration of the decreed time, but a single opposition had been made, viz.: to the lands of San Juan del Rio, by the Señora TINOCA; but no title of property was presented, because she declared it had been lost; but she had appealed to the Minister of Fomento, in Mexico, accompanied by the documents concerning her claim to the mentioned lands, to the end that she might have presented to her the respective titles. On the termination of the period of time granted to those interested to present themselves, the Señor CHERRY demanded possession of the respective lands successively, from the reason that no documents evidencing claim or title to them had been presented, nor had any person disputed verbally, and he took exception to the protest of Señora TINOCA. This Sub-Prefectura, in view of the Government decree, issued by his S. M., the Emperor, on 8th November of the preceding year, is ignorant of any of its articles comprehend in their conditions, the concession extended to the Señor CUMMINGS CHERRY; and that all may be proper and correct, he begs permission to leave it in the better judgment of your Excellency, that, if it pleases, you may give him explanation and direction what is his duty to do in this proceeding. The interested party will present to your Excellency the documents relating to his denouncements.

God guard your Excellency many years!

The Sub-Prefectura of Moctezuma,

GREGORIO MORENO. {SEAL.}

Señr. Superior Prefector (Governor) of the Department, Hermosillo.

Imperial Mexico.
Superior Political Prefector of the Department of Sonora. } GUAYMAS, April 11th, of 1866.

With date 27th of March, of 1857, the Minister of Fomento resolved on a solicitude of CHARLES DENMAN, of which resolve the following is a copy:

[See Original Grant, ante pp. 62 and 64.]

And the petition of the claimant I return to you, for your attention; and in order that you may take the necessary steps for the legal measurement and demarkation of the lands, and the carrying out of the conditions of the concession copied above.

The Superior Prefector (Governor) of the Department,

J. M. ASTIASARAN. {SEAL.}

Señor Sub-Prefectura of the District of Moctezuma.

I certify the above is a true copy of the original.

P. A., Secretary of the District, The Municipal Commissioner,

JOSE ZUBIAS

Imperial Mexico.
Sub-Prefectura of the District of Moctezuma. } April 21st, of 1866.

The Señor CUMMINGS CHERRY has placed in my hands a communication relative to the official measurement and designation of the lands denounced by the said Señor CHERRY. I can not carry out the order of the Superior Prefector in the present condition of affairs, as I am ordered to march immediately with the garrison of this place to where my Chief Superior may order.

The Sub Prefector and Commandant,

ANTONIO TARAN Y BARRIOS. {SEAL.}

Imperial Mexico.
Sub-Prefectura of Moctezuma. }

April 29th, of 1866.

In order to give possession of the lands, viz: Four Leagues of Public Lands, which the American Citizen CUMMINGS CHERRY has solicited before this Sub-Prefectura, by virtue of the concession, of which a copy accompanies this, I hereby appoint you the Official Surveyor, that you may conduct the measurement of the lands indicated, form the plans and descriptions corresponding, and remit these respective documents to this office for acceptance. If you

determine to accept the appointment, proceed with the measurement without delay, accompanied by the interested party, and the necessary assistants.

God guard you many years !

The Sub-Prefector of Moctezuma,

ANTONIO TARAN Y BARRIOS. {SEAL.}

Señor Don VICENTE PROVENCIO, *Granadas.*

I certify that the above is a true copy of the original.

P. A., Sec'y. of the District, Municipal Commissioner,

JOSE ZUBIAS.

Moctezuma, May 12th, of 1866.

YEAR OF 1866.

COPY

Of the official returns of the measurements of four leagues [or sitios] of the Public Lands, as near as practicable, by the official Land Surveyor, Don VICENTE PROVENCIO, at the place named San Juan del Rio, in the District of Moctezuma, in favor of the American Citizen, CUMMINGS CHERRY.

GRANADAS, May 2d, of 1866.

No person having presented any interest or claim legally to hold right to the lands denounced, I proceed to the measurement and marking of boundaries corresponding.

VICENTE PROVENCIO, Official Surveyor, specially appointed by the Sub-Prefectura of the District, in order of 29th of the preceding month, as resolved and appointed in the ordinary form.

I Attest,

VICENTE PROVENCIO. {SEAL.}

Attest—JESUS DURAZO,
JESUS PROVENCIO.

OPUTO, May 3d, of 1866.

When about to proceed to the measurement of the lands denounced in "San Juan del Rio," and when in their vicinity, I sent a notification to the Citizen, ANTONIO MIRANDO, only heir that is known to the Ranche designated by the name "Padre Diego," and entered a copy of the same in my book. He, in reply, said, that in

truth he was the heir, but did not have the evidences of title, nor know the extent or limits of what they called for. This he said, but did not sign, not knowing how to write.

So say I, the Official Surveyor, with my assistants evidencing.

VICENTE PROVENCIO. {SEAL.}

Attest—JESUS DURAZO,
JESUS PROVENCIO.

On the same day, and at the same place, in accordance with my duty, I appointed the necessary officials to assist me in the measurement solicited. I nominated, as accountant, the Citizen JOSE DURAZO, and as marker and pointer, the Citizen VICENTE RIOS, and as chain bearers, with others of this class, ANTONIO OCHOA and JOSE MUÑOZ.

VICENTE PROVENCIO, Official Surveyor, as resolved and appointed in the usual form.

VICENTE PROVENCIO. {SEAL.}

Attest—JESUS DURAZO,
JESUS PROVENCIO.

AT THE RANCHE OF SAN JUAN DEL RIO, ON THE 3D DAY OF THE MONTH OF MAY, OF EIGHTEEN HUNDRED AND SIXTY-SIX.

I, VICENTE PROVENCIO, Official Surveyor, appointed to measure these lands, in company with Mr. CUMMINGS CHERRY, Citizen of the United States, and with the officials appointed and named in the preceding certificate, and with my assistant and witnesses, with the object of measuring and marking the limits of the four leagues of public lands denounced by the accompanying Señor, proceeded to make careful view and recognition of them; and from my examinations, I formed a description, viz: That on either side of the Rio Grande (or Yaqui) are bottom lands of extent, and highly adapted to cultivation, and a supply of water sufficient for any purpose required can be brought upon them from the river, at a small cost. These bottom lands are abundantly timbered with such classes as are common to the country, viz: Mesquit, Chinos (live Oaks), Alamos (Poplars), Fesetas (Iron wood), and others. Besides the River Grande, the lands are plentifully supplied with other strong streams of water, and permanent water springs. The Cañon of the Heurigos abounds with timber of this name and species. The lands en-

closing the river bottoms and the valleys are mountainous, and nearly impassable. There are different varieties of grass, though on the higher points the pasturage is poor.

Previous to the inspection of the lands, I received from the officials appointed, the usual affirmation to discharge faithfully and justly their respective trusts, and, in continuation, delivered to the official measurers a tape, formed of wire, of the most improved invention, containing fifty English feet, which I measured, and found to be equal to eighteen and a third Mexican yards (varas), and which, in my measurements, I allowed it to be.

I commenced the measurement on a red crest, below which, the River Grande breaks through the rocks, and in the vicinity of, and on the same side with the mouth of the Cañada of "Joriquipe;" and having taken observations of the courses with an instrument or compass, whose needle traversed perfectly, I took the direction to a point North of East, forming an obtuse angle at the North-West corner, making the line marked on the map of the survey as "No. 5," from the letter "**A**," and found it to run in a course eighty degrees to the East. In this course I measured ten thousand Mexican yards, passing between and beyond the "Valenzuello" mountain, and another—a red mountain—to the North of this, and coming to a termination on a crest of a "sugar-loaf" mountain on the other side, where I erected the monument designated by the letter **B**.

From here I took a course South, and carefully measured five thousand Mexican yards, running to a crest of "Pañas Blanca" (white mounds) on the brow of a high mountain, where I erected the monument designated by the letter **C**.

From here I continued the line in a course twenty-two degrees to the West, and measured eight thousand eight hundred and forty Mexican yards, terminating at a mountain of lofty crown rocks or table crests, designated on the accompanying map by the letter **D**.

From here I took a course fifty-four degrees to the West, and measured five thousand five hundred Mexican yards, to a mountain which is at the foot of a loftier one, and beyond the cañon of the Heurigos, on which I erected the monument represented on the map by the letter **E**.

And, in conclusion, I took a North course, with twenty-four degrees to the West, and measured ten thousand six hundred and sixty Mexican yards, which terminated at the point from which I started.

By this conclusion I have completed the measurement, and have,

as a result, the figure represented by the dark lines of the accompanying map, within which is contained an area or superficies of ninety-seven million seven hundred and sixty-nine thousand square Mexican yards. Adjacent, on the South, is the "Padre Diego" Ranche, and on the North-West and East are unoccupied lands.

And in conjunction with the possessor, the officials who accompanied, and my assistants, I affirm,

VICENTE PROVENCIO,
CUMMINGS CHERRY,
JOSE DURAZO.

Attest—JESUS DURAZO,
JESUS PROVENCIO.

SAN JUAN DEL RIO, May 6th, of 1866.

Having concluded the measurements, and designated the limits of his land, I notified Mr. CHERRY; and in effect said that the measurement I had made, did not quite contain the one hundred millions of square Mexican yards, which corresponded to the four leagues conceded; and if he agreed to accept that which I have measured, to manifest it by signing with me and my assistants.

VICENTE PROVENCIO.
CUMMINGS CHERRY.

Attest—JESUS DURAZO,
JESUS PROVENCIO.

MOCTEZUMA, May 11th, of 1866.

Having concluded the measurement, and marked out the limits of the lands of the denounced, and completed the statement of the same, and the description of the lands and the matters connected therewith, I remit them to the Sub-Prefectura of the District, for the final disposal.

VICENTE PROVENCIO, Official Surveyor, so concludes and affirms in the usual form.

VICENTE PROVENCIO. { SEAL. }

Attest—JESUS DURAZO,
JESUS PROVENCIO.

Note.—In six leaves of writing of utility, I remit these statements of proceedings to the Sub-Prefectura of the District for final disposal.

DESCRIPTION OF PLAN OF SURVEY.

A—Obtuse angle to the North-West; on a crest, below which a Rio Grande (the Yaqui) breaks through the rocks, and in the vicinity of, above, the mouth of the Cañada of "Joriquipe."

B—Acute angle to the North-East, on a "sugar-loaf" mountain, marked with a crest facing the upper terminus of the Valenzuello mountain, and running nearly in the same course, and overlooking the crest of the San Patricio vein, and in view of the Valenzuello vein, which is at the base of the mountain of this name. It has, to the West, a mountain with a peculiar red, velvety appearance. This monument mountain is of the same color.

C—Obtuse angle to the East, on a white crest, "Peña Blanca," which is on the brow of a high mountain.

D—Obtuse angle to the South. On a mountain not very high, crowned by a peculiar occurrence of rocks, or round crests.

E—Acute angle to the West. On a mountain, at the base of a very elevated one, beyond, and overlooking the "Cañon de los Heurigos." The monument is erected on a mound of loose rocks, and the sides of the mountain are composed of loose rocks.

RÉSUMÉ:

No. 1, Trapezium	55,687,500
No. 2, do.	34,555,250
No. 3, Triangle	3,278,750
No. 4, do.	1,277,500
No. 5, do.	2,970,000
Total sum of square yards	97,769,000

VICENTE PROVENCIO. {SEAL.}

MOCTEZUMA, May 11th, of 1866.

Secretary General of the Department of Sonora.

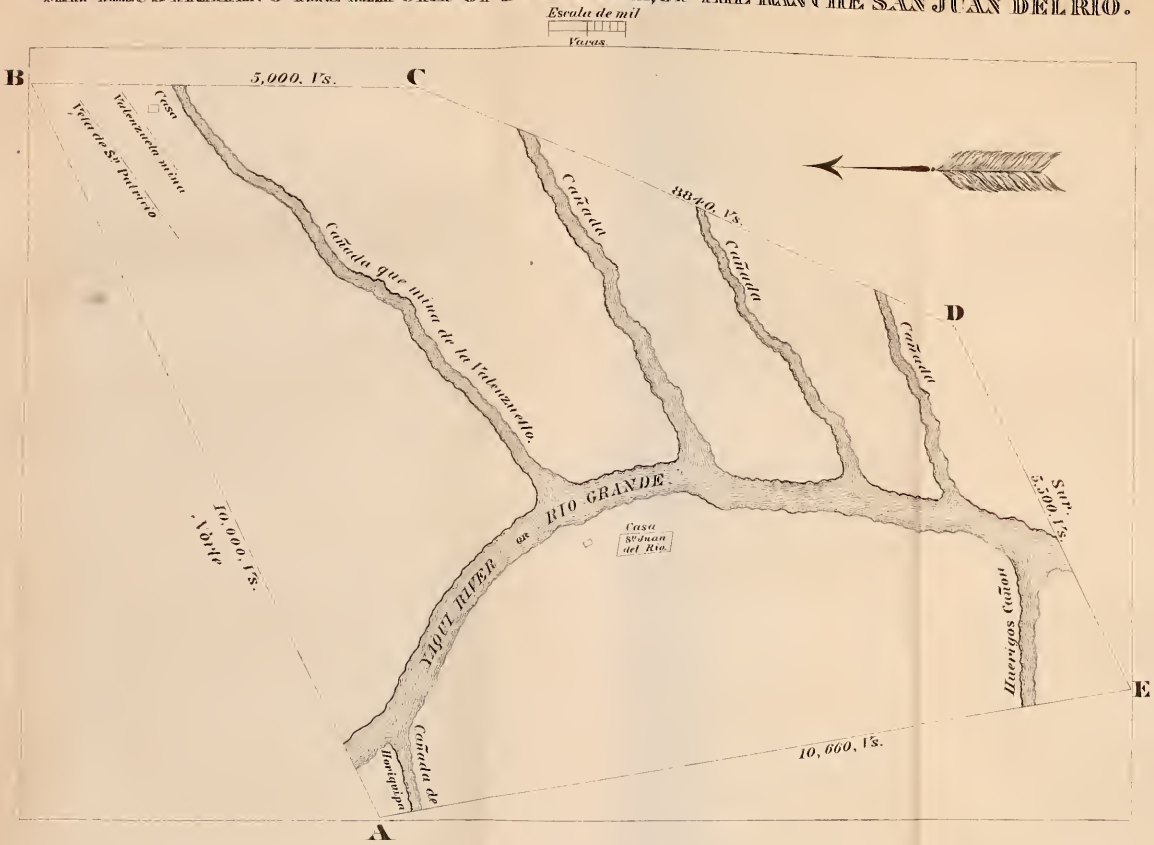
URES, May 19th, of 1866.

I certify that the within is a copy of the original statement of proceedings in San Juan del Rio, by order of the Señor Political Prefector Superior of the Department of Sonora.

The Secretary General of Sonora,

Y. SEPULVEDA. {SEAL.}

MAP ILLUSTRATING THE REPORT OF SURVEYOR, OF THE RANCHE SAN JUAN DEL RIO.



Administration of Taxes of the Department of Sonora. 2d Class—4th Seal—12½ Cents—No. 767. *Qualified for* 1866 *and* 1867, *in conformity to the Supreme Order of* 29*th of November of* 1865. URES, JANUARY 20TH OF 1866.

Francisco N. Lòpez. *Manuel Terân.*

Imperial Mexico.
Commissioner Municipal of Moctezuma.

JOSE ZUBIAS, Commissioner Municipal of Moctezuma, etc., in conformity to law,

Certifies: That in the absence from the District of the Señor Sub-Prefectura, Don ANTONIO T. Y BARRIOS, and his substitute, Don YGNACIO SOTO, and in virtue of my appointment by the latter as his substitute to the charges of the Sub-Prefectura of this District, I have received from Don VICENTE PROVENCIO, Official Surveyor, the papers of proceedings of the measurements ordered of the lands of San Juan del Rio and Nacosari, in favor of the American citizen CUMMINGS CHERRY; and as said party possessing asks to convey these documents of proceedings to the Superior Political Prefector of the Department, this Commissioner-substitute, in the absence of the Señor Sub-Prefector, in conformity with the Article 31st of the law of November of 1865, regulating the Administrative Department, and by the party concerned, remits the indicated papers of proceedings to the Señor Superior Prefector for his final disposition.

MOCTEZUMA, May 12th of 1866.

The Commissioner Municipal,
JOSE ZUBIAS. {SEAL.}

VICENTE PROVENCIO, Official Surveyor appointed, certifies, in the legal form, as follows, to-wit:

I am acquainted with and have made measurement, as ordered, of the lands of "San Juan del Rio" and "Nacosari." In relation to the first named, it has been abandoned more than twenty-five years, for which reason its houses have almost entirely fallen to ruins. The mines of "San Patricio" and "Valenzuello" have been abandoned perhaps a little more than a year. The last named, I am informed, and the public say, has been abandoned over sixty years. The new *reâl* of the same name, "Nacosari," from what I understand, has been shortly abandoned. And in order that this may be used to the benefit of the party concerned, I present it in Moctezuma, the 12th of May of 1866.

VICENTE PROVENCIO. {SEAL.}

Secretary General of the Department of Sonora.

URES, MAY 19TH OF 1866.

I certify that the preceding are correct copies of what they profess, each folio having been marked with my seal.

The Secretary General of Sonora,

Y. SEPULVEDA. (SEAL.)

Imperial Mexico.
Commissioner Municipal of Moctezuma.

MOCTEZUMA, MAY 12TH OF 1866.

By request of the American Citizen CUMMINGS CHERRY, as owner and proprietor of the lands of San Juan del Rio, you will notify the inhabitants of the pueblo not to trespass upon, nor carry away any of the elements of these lands measured in favor of the American Citizen CUMMINGS CHERRY, for *they are the property of this Senor.* The elements of which I speak are the water, lime, timber, and others, which are placed in the charge of Don JUAN AVAREZ by the proprietor.

God guard you many years!

By the acting Sub-Prefector of the District, The Commissioner Municipal of Moctezuma.

JOSE ZUBIAS. (SEAL.)

Señor Commissioner Municipal of San Ygnacio, Oputo.

Imperial Mexico.
Superior Political Prefector of the Department of Sonora.

URES, MAY 19TH OF 1866.

MOST EXCELLENT SEÑOR:

I remit to your Excellency two proper measures of denouncements of lands located in this Department. The one of San Juan del Rio, in the District of Moctezuma, is denounced in accordance with the concession made by the Government in March of 1857, of four leagues of the public estate, wherever found by the concerned party. This concession was granted to the American, C. DENMAN, who conceded his right to EDGAR CONKLING, who has empowered the American, CUMMINGS CHERRY, the denouncer. All this appears in the original documents in English and Spanish, which I have the honor to remit your Excellency.

It is manifest from the publication of the denouncement in the "Periodico Oficial," in which it appears in the same form as the original accompanying, that the same conforms to law. There is a

single opposition to the land of San Juan del Rio, by the Señora TINOCA; but she did not present any title of property, nor appear before the political authority—as he represents—to make her protest or prove her rights, but contents herself with saying that she has lost her title and has occurred to the Minister to recover the title corresponding. Your Excellency will better determine what is convenient and proper in this particular.

As the concession granted to Señor DENMAN *expresses and orders only that the measuremements be taken, in order to have the title corresponding made out and remitted without further delay*, they are herewith remitted to your Excellency. The party denouncing has paid the just expenses of the survey, with the other corresponding ones that were incurred. *In case the title is extended, your Excellency will please issue it in the name of Mr.* EDGAR CONKLING, *who is the actual owner.*

With respect to the other Ranche of Nacosari in the same District, it also was denounced by the Señor CUMMINGS CHERRY, American Citizen, as public land, under the same concession. The publication of denouncement requisite was made correctly. The documents relating to the matter and the denouncement expresses being made under the terms of a concession of the Señor COMONFORT of 1857. He has no such concession to place upon it, the denouncer informs me; but it was denounced solely as a matter of precaution by the Señor CUMMINGS CHERRY. I owe it to remark to your Excellency that this Prefectura labors in complete obscurity in so far as relates to the legacies of your decrees. The recent laws and others which yet remain in force have been lost in the many revolutions, and during which many important documents have also been taken away. For this reason I remit all for the consideration of your Excellency.

Accept, Your Excellency, my respects.

The Prefector (Governor) of Sonora,
MARIANNA SALAZAR. {SEAL.}

Most Excellent Señor Minister of Fomento, Mexico.

Imperial Mexico.
Superior Political Prefector of Sonora.

URES, MAY 19TH OF 1866.

The Señor CUMMINGS CHERRY is bearer of a sealed package of papers, relating to certain lands in which he is the party concerned, addressed to the Minister of Fomento; and in virtue of the peril of

the transit, I entrust them to him for deposit in the Post office of Guaymas, or other place which he may consider most sure or to the purpose, so that they may not be lost.

The Secretary General of Sonora,
Y SEPULVEDA. {SEAL.}

Post Office of Guaymas.

The expressed Señor CHERRY has delivered at this Office for certification and franking a letter parcel for the Most Excellent Señor Minister of Fomento, the which to be despatched with care by the "Almirante," which sails to day for Mazatlan.

The Post Master General of Interior,
JUN$^{L.}$ MORALES.

Guaymas, June 9th of 1866.

GUAYMAS, JUNE 10TH OF 1866.

S. Don JOSE SALAZAR YLARREGUI, Mexico.

VERY DEAR FRIEND:

Some days ago I addressed a long letter to you, which called to my memory many recollections of our old time friendship. And now I take the liberty to recommend to you by this note, Mr. CUMMINGS CHERRY, who has in hand business of importance with the Government concerning land concessions in this Department.

The Señor CHERRY enjoys the best reputation, and his acknowledged ability and industry will make him productive of great benefits to the country and to the lands which he solicits, and which now remain uncultivated and abandoned.

I anticipate to give you thanks for the protection and support which I beg you to extend to this gentleman, that he may have the opportunity to carry into effect his very excellent designs.

I repeat myself ever your affectionate friend and servant,

J. M. ASTIASARAN.

Most Excellent Señor Minister of Government,
S. Don JOSE SALAZAR YLARREGUI,
Mexico.

MINING ESTIMATES AND STATISTICS.

CINCINNATI, O, Aug. 20, 1866.

To the Members of Cincinnati & Sonora Mining Association.

GENTLEMEN :—

You desire items of expense in mining operations in the Nevada (Virginia City and Gold Hill) silver mines, as compared with those which will be incurred on your property in Sonora.

When Superintendents of mines in Virginia City and vicinity, stamping and amalgamating of ores cost us $25 per ton; labor $4 per day for miners, and $5 per day for mechanics; lumber $80 to $120 per thousand feet; timber 80 cents per square foot; freight from Sacramento 6 to 8 cents per pound; hauling ores to mills $3 to $5 per ton. The average yield of ores was $42 per ton.

In your mining operations, if governed by practical and experienced managers, the reduction of ores by water power will cost $6 to $8 per ton, labor 50 cents to $1 per day, and hauling ores to mill $1 50 to $2 per ton. The present rates of freight from Guaymas are 5 cents per pound; and timber is upon the ground, for all purposes. Food and forage can be procured on the ground. Respectfully,

CUMMINGS CHERRY,
JAMES CHERRY.

ESTIMATE OF EXPENDITURE

Necessary to place the San Juan del Rio property of Cincinnati & Sonora Mining Association on a producing basis.

Opening Mines,	$20,000
Making Roads to Mines,	4,000
Erecting Dam and Flume,	40,000
Erecting Mill and Beneficiating Works,	30,000
Building Houses,	5,000
Total in Gold,	$99,000

This estimate is placed at outside figures.

CUMMINGS CHERRY,
JAMES CHERRY.

Cincinnati, Aug. 20, 1866.

PROFITS OF SILVER MINING.

Two facts—and "facts are stubborn things"—are very conclusive as to the profitableness of silver mining Companies:

1. At the mining stock boards in the great commercial cities of the East and Europe, although hundreds of gold and copper and lead and coal mining stocks, are bought and sold, and gambled in, the stocks of well managed silver mining companies are seldom, or never offered. The reason is, *it pays better to hold them*—so astonishingly large are the dividends, declared *monthly*, and *in gold coin*. Such stocks do not often change hands, and are the choicest investments that can be made.

2. The New York *Evening Post*, of August 14, 1866, has advertisements as follows:

DIVIDENDS—AUGUST, 1866.

Yellow Jacket Silver Mining Company,				$50	per foot.
Hale & Norcross	"	"	"	$75	"
Savage	"	"	"	$50	"
Imperial	"	"	"	$ 6	per share.

All payable in gold on 15th August, by Lees & Waller, 33 Pine Street, or Eugene Kelly & Co., 24 Nassau St.

These are the very latest *monthly* dividends. The following table gives the product of bullion from 14 mines in the Washoe District, Nevada Territory, during about five months immediately preceding May 1, 1865:

"Gould and Curry,"	$477,183 98
"Yellow Jacket,"	720,107 54
"Savage,"	605,233 40
"Chollar,"	440,000 00
"Belcher,"	314,130 00
"Potosi,"	308,120 92
"Imperial,"	201,344 55
"Empire,"	119,208 49
"Confidence,"	89,042 10
"Ophir,"	57,712 20
"Eclipse,"	55,568 05
"Challenge,"	51,799 44
"Bacon,"	41,989 07
"Crown Point,"	36,331 00

The *average* yield of these 14 mines for the five months, is $251,269 34, or at the rate of $603,046 44 per annum *each*, in bullion, worth in United States currency on the 22d of August, 1866, $826,173 62.

The total yield of the "Gould and Curry" mine, to July 1, 1865, was $14,500,000.

The "Savage Silver Mining Co." paid in 1865 a net profit of 43 per cent. per month on its actual capital paid in for development and improvements.

The "North Star," in five months of 1864, paid a net profit of $240,000 in silver, from a 10 stamp mill, an average yield of $160 for each stamp. In 1866, the "Savage" is yielding $1400 per day in silver from a 10 stamp mill, an average of $140 per stamp. The ores on the San Juan del Rio property of the Cincinnati and Sonora Co. will enable them to make at least as good an average, which with the proposed 20-stamp mill, will reach $3,000 per day, or $900,000 per year. But the water power of this Company is so unlimited, and the ores so rich, so abundant and so easily mined, that 100 stamps can be erected and worked with comparatively small increased cost. If the Valenzuello mine, on this property, when last worked, alone yielded $1,000,000 per year, with inefficient reduction processes that failed to abstract a considerable proportion of the precious metals, it is readily seen that $2,000,000 to $3,000,000 per year of bullion can be extracted from this property. Several mines in Nevada have 20-stamp mills, and one is doubling that number.

The latest sales of the shares of the stocks of these Silver Mining Companies at San Francisco on Sept. 8th, 1866, were at the following extraordinary rates:

Gould and Curry,	$710	per share or foot.	
Yellow Jacket,	775	"	"
Savage,	1100	"	"
Chollar,	140	"	"
Imperial,	95	"	"
Empire,	120	"	"
Ophir,	200	"	"
Hale and Norcross,	1600	"	"

The San Francisco "*Alta California*" newspaper of July 7, 1866, in its commercial leader, says:

The late discoveries of ore in the Hale and Norcross have disclosed a vein 30 feet wide of $50 ore, and extending 160 feet. The receipts of the month will be $100,000, against $65,000 for the month of May.

The developments of the Savage are better, and the June product $130,000.

The Crown Point also improves, and the receipts are $105,000 for June.

The Gould and Curry gives for the month of June $146,000. The yield for six months has been $36 90 per ton, at a cost of $12 12 per ton—$7 56 for mining; six months' yield, to June 1st, $908,119.

The Imperial reports better prospects, and the receipts for June $61,000.

The Yellow Jacket product of bullion for June is estimated at $260,000.

Thus these six mines give at the rate of nearly $10,000,000 per annum; and the expenses less and more regular than last year.

ASSAYS OF SURFACE ORES.

Assay of three specimens of the ores gathered from the surface, or from rubbish heaps, of the San Patricio mines, by Mr. CHERRY, assayed by Prof. E. S. WAYNE, Analytical Chemist, Cincinnati, August 30, 1866:

No. 1—	1,254 oz., 2 dwt., 12 gr.,	$1,672 16,	gold value,	per ton of	2,000 lbs.
No. 2—	16 oz., 12 dwt., 12 gr.,	22 03,	"	"	"
No. 3—	124 oz., 15 dwt.,	165 00,	"	"	"

These results are their values in *gold;* or, in United States currency, about $2,475, $32 50 and $245 respectively.

CHEMICAL LABORATORY AND MINING OFFICE,
138 Walnut St., Philadelphia, Sept. 5, 1866.

MR. CHAS. C. REAKIRT,
Cincinnati, Ohio.

Sir:—I have the honor to transmit herewith the result of analysis of sample of Copper ore marked "San Patricio," submitted to me for examination.

The said sample contains:----------	Of Lead,	3.043 per cent.
	Of Copper,	56.06 "
It also contains at the rate, per ton of 2,000 lbs. of Ore,----------	Of Gold,	A trace
	Of Silver,	26 oz., 16 dwt., 16 grs.
		Coin Value, $36 06.

Also, the result of analysis of sample of Copper ore, marked "Don Eduardo," sent with the above for examination.

The said sample contains:_____Of Lead, 0.558 per cent.
Of Copper, 58.58 "
It also contains at the rate, per ton
f 2,000 lbs. of Ore,_____Of Gold, A trace.
Of Silver, 19 oz., 5 dwt.
Coin Value, $25 85.

Respectfully,
CHARLES P. WILLIAMS,
Analytical Chemist and Metallurgist.

FIRE ASSAYS OF ORES,

Taken from the Valenzuello and San Patricio Mines, on San Juan del Rio Ranche, Sonora, Mexico:

Valenzuello.

No. 1.—1 oz. black quartz from top of excavation, contained at rate of 5¼ grs. metal per pound.

5¼ grs., value 0.017875 Silver; 1 lb.: 2000 lbs.:: .017875=$35 75
0.008285 Gold; 1 lb.: 2000 lbs.:: .008285= 16 57

Yield per ton,_____$52 32

No. 2.—1 oz. from excavation 40 feet below surface, contained at rate of 17.309 grs. metal per pound.

17.309 grs., value 0 07343 Silver; 1 lb.: 2000 lbs.:: .07343=$146 86
0.02171 Gold; 1 lb.: 2000 lbs.:: .02171= 43 42

Yield per ton,_____$190 28

San Patricio.

No. 1.—1 oz. from vein outcrop on summit ridge, contained at rate of 6.925 grs. metal per pound.

6.925 grs., value 0.023666 Silver; 1 lb.: 2000 lbs.:: .023666=$47 33
0.013 Gold; 1 lb.: 2000 lbs.:: .013 = 26 00

Yield per ton,_____$73 33

No. 2.—1 oz. from vein outcrop on summit ridge, contained at rate of 20.06 grs. per lb.

20.06 grains, value 0.0865 Silver; 1 lb.: 2000 lbs.:: .0865=$173 00
0.024 Gold; 1 lb.: 2000 lbs.:: .024 = 48 00

Yield per ton,_____$221 00

Accompanied by zinc, lead, antimony and arsenic, but quantities not determined.

Cinco Sonores Mine.

Fahlerz and Red Oxide, 46.5 per cent. Copper, $72 50 Silver per ton.

Don Juan Mine.

Fahlerz and Red Oxide—33.5 per cent. Copper, $51 50 Silver per ton. Zinc, and antimony, and traces of gold.

Don Eduardo Mine.

Tetrahedrite—37.8 per cent. Copper, $65 30 Silver per ton.

CUMMINGS CHERRY,
JAMES CHERRY.

Pittsburgh, Pa., August 31, 1866.

RECAPITULATION.

San Patricio.—Six samples of ore from this mine on the San Juan del Rio property were assayed by the eminent chemists named above, with the following comparative and aggregate results, per ton of 2000 lbs.

		Gold.	Silver.
By Prof. WAYNE,	No. 1, gold value,		$1,672 16
	No. 2, " "		22 03
	No. 3, " "		165 00
By Prof. WILLIAMS,	No. 1, " "	A trace.	36 06
By Messrs. CHERRY,	No. 1, " "	26 00	47 33
	No. 2, " "	48 00	173 00
		$74 00	$2,115 58
			74 00
			$2,189 58

An average of $364 93 to the ton of ore.

Valenzuello.—Only two samples of the ore from this mine have been assayed, both by Messrs. CHERRY, and yielding to the ton of ore as follows, in gold or coin value:

	Gold.	Silver.	Total.
No. 1,	16 57	35 75	52 32
No. 2,	43 42	146 86	190 28
			$243 60

Or an average, per ton, of $30 gold and $91 30 silver, or $121 80 of both.

Cinco Sonores, Don Juan, and Don Eduardo.—These mines, it will be remembered, are not on the property of the "Cincinnati and Sonora Mining Association," but will be more or less dependent upon the water power on their property for beneficiating their ores. The assays above, shows an average richness per ton, of $53 79 in Silver, (coin value,) besides an average yield of Copper of 43.69 per cent., or 974 lbs. out of every 2000 lbs.

SILVER MINES IN MEXICO.

Senor Zambrano's two mines in 24 years yielded $55,000,000, or per year	$2,291,667
The "San Dimas" in 25 years yielded over $25,000,000, or per year, over	1,000,000
The "Pavillon" yielded $20,000 per day, and divided per year over	6,000,000
The "Gallego" in 6 years yielded $11,000,000, or per year	1,833,334
The "San Avasco" in 3 years divided $54,000,000, or per year	18,000,000
The "Santa Eulalia" in 32 years yielded $55,959,750, or per year	1,748,742
The "Semprerate" paid in 7 months $5,000,000, or at the rate per year	8,571,429

The average yield of these 8 mines, per year, was $4,930,646.

These statistics are from the mining records of Mexico, and many of them are from the revenue tax or "King's-fifth" reports, and calculated from the *tax actually paid*—a reliability that will not be disputed in these days. This tax has long since ceased to be assessed.

GENERAL REPORT,*

BY

CUMMINGS CHERRY and JAMES CHERRY,

Geologists and Mining Engineers.

To the Members of the Cincinnati Mining and Land Association of Sonora, Mexico:

GENTLEMEN:

We arrived at Guaymas, Sonora, on the 10th of December, 1865, and on the morning of the 13th took our departure by stage for Hermosillo. Our short stay at Guaymas was sufficiently protracted to impress us with the important part it must play in the future of Sonora. The town is situated on the Gulf of California, in Latitude 27° 42′ North. Its harbor is eminently the best on the Western Coast of Mexico, being much superior to either San Blas or Mazatlan; and because of the trade winds, particularly desirable as a port for the trades of the East Indies and China. The bay consists of an inner and outer one—in all four to five miles in length— almost completely sheltered from the winds by the bold hights of the Pajaros on the east, and the islands of Terra Firma, San Vicente and Petayas on the west, leaving the channel, narrow and deep, between them. Another entrance, Boca Chica, occurs between Pajaros on the south and Cochin on the north. The tides are irregular, being governed by the winds of the Gulf, seldom rising and falling more than four or five feet. The depth of water

[* Portions of this Report, of little or no interest to the general reader, are omitted.]

is two fathoms at the mole, which is a very superior one, to eight fathoms in the channel. The town is surrounded by the irregular hills of the coast range, through which there is but one entrance from the land side. These hills, devoid of vegetation, give the town a dreary aspect; it is small and of modern origin, containing one spacious street and several cross thoroughfares. In 1820 to 1825, when a free port, a considerable business was transacted with foreign ports, and it was not uncommon to find twenty or more vessels loading and unloading at one time. This activity was prematurely checked by the internal strifes of the following five years, during which it lost over two-thirds of its population. During the years of 1850 to 1864 it received an impetus from the American mining and other enterprises; considerable capital was invested in town lots, and many improvements of a permanent character were inaugurated, giving to the town a population of over 5000, and the appearance and live awake air of a California mining town. The present unfortunate strife and the despotic incubus of a French garrison shackled this new-born energy, and, at the present writing, Guaymas is in as fossilized a condition as need be. Were it not for the continual clanging of large and small bells with hoarse throats and shrieking voices, the daily occurrence of a procession of saints, images and wax candles, the snarling of curs, the rioting of marines from some foreign war vessel, and the occasional view of a native propping up a house, or picking vermin, we would have no out-door indications from which to conclude the place was settled. With the native inhabitants, life seems to be a *dolce far niente*, or, more truly, wretchedness, filth and inanity. There are a number of fine structures of the architecture peculiar to this country, and a few of American pattern. The exports are the common products of the country—wheat, corn, flour,

cotton, tobacco, unrefined sugar, aguadiente, beef, hides, gold, silver and copper; for which it imports the products of the more southern states, and East Indian and European manufactures. Its exports of products and bullion for 1865, could not have fallen short of $4,000,000, though, for the present year, it will hardly exceed half of this sum. The climate is pleasant from November to April; the heat in the summer months, June to September, is excessive, the mercury reaching 105° to 110°, and very seldom falling below 97° or 98°, and when the hot winds visit the town, as they often do during the summer months, it frequently reaches 135°. There is but little sickness, and what occurs is of a light character; the water which supplies the town is procured from wells sunk at the limits of the town, and is slightly brackish, though wholesome. With a harbor capable of giving good anchorage to two hundred vessels, safe navigation in the Gulf, and a section of country requiring only peace, enterprise, capital and the energy of American settlers, to till the lands and work the mines which Mexican indolence has permitted to fall into ruin—with the indomitable spirit of American advancement, to make of an old country a new California—Guaymas is destined at no distant day to take her place as the grand commercial depot of Western Mexico, and, I would venture to predict, of our own extreme South Western Territories.

ROAD TO HERMOSILLO.

In sixteen hours after our departure from Guaymas we were in Hermosillo, 38 leagues distant in a northerly direction. The road follows an almost level plain, and is, perhaps, the best natural wagon route I have seen in any country. This plain is enclosed on either side by the most westerly of those foot ranges of the Sierra Madre, which rise in successive steppes over the face of Sonora as we proceed eastward,

each becoming more prominent, until the mother chain on the extreme eastern borders of the State is encountered. In many places this plain is 20 to 30 miles wide, with scarce a roll to interrupt its regularity. This stretch of country is ever dreaded by travelers on foot or horseback, being very destitute of water, and at this season of the year presenting an uninviting prospect, with no vegetation but the thorny mesquit and palo verde devoid of leaf or blossom; great stretches producing naught but the choya—a species of cactus, literally invulnerable with barbed prickles. Occasionally there are patches of quicksand, which were once the beds of water courses. At four stations on the road water was to be had by paying for it: at Caballo, 5 leagues from Guaymas, is a well about 30 feet deep, containing very good water; 10 leagues beyond at La Cieneguitta, is a well with a very limited supply, and a reservoir containing no water; at La Palma, 10 leagues from the last named place, we found a fair supply of water, in a reservoir substantial and quite spacious, and which could not have cost less than $5000 in its construction; at La Posito, 7 leagues from Hermosillo, is a reservoir now dry, and a well with a limited supply. It is not an uncommon occurrence for all of these to fail. I am thus particular in describing this stretch, for though, on this my first journey over it, I was hurried along, I have since been obliged to make three trips over it on horseback, and when foul and rancid water seemed a beverage "fit for kings."

All of these watering stations are stock ranches, and have extensive corrals connected with them. La Palma possessed 2000 head of cattle, horses and mules; and La Posito not less than 6000. These cattle wander out on the plain during the day and feed upon the sun-dried grass and the bean of the mesquit tree, and seek the corrals for water at night.

When the supply of water fails, they browse upon the choya plants, beneath whose barbed exterior is a pulp containing a secretion of water. The soil of the plain is principally a red loam, heavily intermixed with the course grains of a decomposed feldspathic granite, washed in from the adjacent ranges by the torrents of the rainy season; and this feldspar having an alkaline basis, acts as a very valuable fertilizer to such clayey soils. The only element needed to redeem a great part of these lands from their present wild state, and make them as eminently adapted for cultivation as any I have seen in Sonora, is a sufficiency of water. In my more recent journeyings over the plain, I have looked into the nature and lay of the formations forming the enclosing elevations, and the order of occurrence of the plain strata; and I am very confident that through a system of artesian borings, prosecuted at certain favorable points throughout its length, a sufficiency of water for agricultural purposes may be obtained. And in this is a safe and profitable adventure for enterprising spirits.

HERMOSILLO.

The principal town, and among the most ancient in Sonora, is Hermosillo, formerly known as Petic. It is situated near the confluence of the San Miguel (or Dolores) and Sonora rivers which, however, in the dry season lose their waters in the quicksands just above the city, and do not again appear; it being supposed that they have a subterraneous passage to the Gulf. This is a peculiarity of the rivers of Sonora—which, with two exceptions, the Yaqui and Mayo, are at the best but creeks—and is owing to the peculiar structure of their beds which run through loose quaternary deposits; so when the waters reach these they sink in them and take their course underground, appearing only where the mountains close in upon them and throw the un-

derlying older formations to the surface, or where ridges or dikes cross their course. Hermosillo is situated in a charming valley, four to five leagues in extent, and partly surrounded by the Chenate hills on the west and "Cerro de la Campana" on the east; while on its skirts are the agricultural lands of San Juanico, Chino Gordo, and Chenate, and of the Ceres settlement on the south. Its population by the census of 1840 was 14,000, including 2,000 Yaqui Indians; and on this, my first visit, did not exceed 15,000. Hermosillo is by far the pleasantest town in Sonora; its streets are narrow, though there are several very good thoroughfares, graced with many comfortable and a few elegant structures used as residences, and which are made yet more cheerful by enclosures devoted to the culture of fruit, vine and ornamental trees and shrubbery. There is no more delightful view than that which is presented in the summer season by the blooming *milpas* adown the valleys, with their hedges golden with flowers and redolent with perfumes; and the residences, of unique and antique appearance, nestling amid orange and fig groves and flowering shrubbery. Its business people are of a superior class, are wealthy and have a slight spice of business energy, almost imperceptible to be sure, but it is there. This is the more surprising because it is a virtue held in contempt by the Mexicans, as a nation or a people. The better classes are hospitable to foreigners, of whom I found quite a number here, principally French and Germans established in business. We arrived at an unfortunate time to secure any extended information; it was very evident, however, that Hermosillo had engrafted in her the true elements of progress and enterprise, though at this time shackled by the misfortune of civil revolution. Situated at a point whence diverge the several channels of communication with Upper Sonora, and also controlling an ex-

tensive agricultural section south, it must ever be the depot of commerce between these sections, and the port of exit and entry. It possessed four flouring mills, with capacity to turn out 300 barrels of flour per day, and several sugar houses in which the native sugar (*panoche*) was manufactured from the cane. No effort worthy of note has yet been made at refining sugar, though the best American grades are used by the wealthier families, to meet which demand considerable quantities are shipped from San Francisco and sold readily at 50 cents to $1 per pound.

At San Miguel, fourteen leagues distant, is a cotton factory, owned by merchants of Hermosillo, running 60 looms with a capacity of 25 yards to the loom per day, in manufacturing a coarse and very inferior cotton fabric known as *manta*, a cloth almost universally used among the poorer classes as their only apparel, and readily disposed of at the factory for 33 to 37½ cents per vara. This is the only establishment of the kind in Sonora, and I am informed the demand for its cloths exceeds the supply. There was also at Hermosillo an extensive wagon establishment, of which an American, Mr. Hale, was proprietor; and the Government mint, with machinery, presses, &c., from Philadelphia, under management of Messrs. Douglas & Simons.

Valesco, writing in 1843, estimated the average annual yield of the agricultural products of Hermosillo at 64,000 bushels of wheat, 270,000 bushels of corn, and 13,000 bushels of other cereals, beans, lentiles, etc.; the annual product of the grape at 1500 barrels of aguadiente, as many of vinegar and but little wine, and the consumption of goods at about $800,000. It would be great injustice to accept these estimates as those of to-day, though I have no correct means of determining the amount of increase. Cotton has become a staple of the country; sugar cane is now cultiva-

ted extensively and with good results, and tobacco is a profitable and productive crop. The culture of the vine has ever been a distinctive feature of this place, and it has yielded large gains, though only aguadiente is made from it, from a want of knowledge to manufacture wines and brandies. With such knowledge the gains would be infinitely greater. Fruits of very many varieties are ever in abundance.

DISTURBED TIMES.

We were unfortunate in having our lot cast in Hermosillo in one of its periods of greatest trial. Its people were incapable of anything but fear, and indifferent to anything but a desire to escape from impending dangers—and I thought not without just reason. But a short time prior to our arrival, a Liberal force under a bandit leader had entered the city and committed many excesses, and were followed by the Imperials with similar action. *Now* we had positive information of a grand revolt of Mexican Imperials at Arispe, and the murder of their officers and march for this place; of the approach of GARSEA MORALES (CACHORA); of the presence of a large force of Liberals or bandits—we knew not which, and they are generally identified with each other—at Magdalena on the Arizona road, and who also were concentrating for an attack on this place; and of revolters and Apaches nearer, committing terrible outrages; and of the near presence of a French Imperial force from Guaymas, and a Mexican Imperial detachment from Alamos. These only were the authenticated intelligences of a day of momentary rumors; and with the Apaches without the city, and committing their terrible butcheries within its outer limits, the alarm occasioned may be imagined. The citizens and foreign residents were ordered under arms and obliged to comply. None seemed to know which of the

contending forces was most to be dreaded. Some buried their treasure and sought retreats in the mountains, while those who had means of conveyance fled to the bordering states, or held themselves prepared to do so at a moment's notice. All this was, of course, in one sense, a matter of indifference to us; but as a natural result of such alarm we met with the greatest difficulty in securing needed assistants for our further progress. And we were soon awakened to a degree of alarm by the unexpected and very exorbitant charges made; though in comparison to some after charges I have been led to believe that our alarm was premature. We were obliged to abandon many pre-conceived views and seeming necessities, and do without the desired escort. The city government insisted on forcing all to take up arms, and many on learning my destination and purposes were unwilling to take the hazardous journey. I could engage but two servants, a Mexican so deeply in debt that his friends would no longer support him, and an Indian who had had a difficulty with his connubial partner—agreeing to pay each $50 per month, the Mexican furnishing his own animal for this sum. I thought myself very fortunate in securing these men. Because of unreasonable demands I refused to engage an interpreter, successively at San Francisco, Mazatlan and Guaymas; and now we determined to dispense altogether with one, as we were enabled to do with safety from the fact that through study and an intimate contact with the people we were acquiring a sufficient knowledge of the language for our purposes. Several times during our stay in the country we were obliged to pay interpreters when in communication with the Governor, though it was because of custom to exact such fees rather than necessity for their services. During these preparations we had our perplexities. We had been strongly of the determination to

proceed direct to Magdalena and Calabasas in Arizona, in the vicinity of which latter place PESQUEIRA was said to have taken refuge. This determination now called for consideration. Numberless refugees (Americans and Europeans) were here from the different sections of the country, but principally from the North ; and I was again afflicted with the tales of violence and the disinterested counsel which had greeted me at San Francisco, Mazatlan and Guaymas. That many deeds of violence had been committed by both Liberal and Imperial was without doubt, and we had an opportunity to sympathize with many of the victims who had been stripped of everything— even their clothing—and left in a barren country, removed from settlements, amidst enemies and without food; though I thought not a few had brought interference upon them by first interfering too freely with the peculiar institutions of the country, and for their intermeddling were driven out. I did not imagine that these contesting parties—Liberal and Imperial—would so far forget policy as to offer any greater violence than the robbery of animals, arms and money; and found that civil demeanor and a silent tongue were much better preventives of interference than boisterous acquiescence. While these tales of violence and the troubles and dangers which encompassed us did not alter my determination to continue on, it had the effect of discouraging a number who had come thus far with the view of continuing through to Arizona from proceeding farther, and we were deprived of their expected company. A railroad surveying party of twenty—principally Americans—had been up in the country with the view of continuing into Texas; but abandoned the expedition through fear of Indians. It was very evident that I could not get through to Calabasas with my animals, arms or money, and without them I was powerless; and, as there was a bare pos-

sibility that I might get around the contending forces on the Sonora river by keeping to mountain trails, I determined to proceed to Ures, and thence follow the mountain chains north. It was the only other route known to me by which I might reach Arizona; besides, I was informed it led me through the most interesting mineral district in the State. I secured only three animals—two horses and a mule, very superior animals, as in our after travel they proved. I required an animal for packing, but dangers were becoming so imminent here that I dare delay no longer; so on the 18th, accompanied by only two servants, my assistant and self started forth, with many misgivings as to the final result of our extremely hazardous undertaking.

TOPAHUE.

Nine leagues from Hermosillo, and on the Sonora river, is Topahue, the hacienda of GANDARA, former Governor of Sonora, and whom PESQUEIRA displaced, obliging him to seek refuge in California. Since the advent of Imperialism he has returned, and perhaps wields more influence for the Imperial cause to-day than any single individual in the State. The Ex-Governor was absent on our arrival, but we were warmly welcomed by his son, who insisted that we should be his guests during the night. We could discern stern poverty struggling through hospitality, and kindly declined. This hacienda is, with the exception of those of La Labor and Alameda near Hermosillo, the most extensive and productive in the State. It is now a picture of war's devastations, for no occasion has been spared by the Liberal party to wreak their hatred upon it. But in the defaced buildings, crumbling mills, partially-destroyed hedges and ruined acequias are evidences of the comfort and even splendor which once reigned here. We remained for the night at San José de Gracia, a league beyond, a dilapidated and almost desert-

ed town, but formerly a noted mining center, and where the reduction haciendas of a large mining district were located, as is evidenced by the extensive deposits of slag and the ruined furnaces on the river banks.

SAN JOSE DE GRACIA.

The mines of San José de Gracia occur in the bold sierras east of the settlement. We have scarcely anything from which to judge of them but such items as tradition gives us, as through abandonment and the ravages of gambucinos their openings have become closed; in tradition, however, they are highly celebrated for their richness. The locality of Los Preciados is known, and some twenty years ago considerable treasure was taken from it by gambucinos, who, while extracting it, lived a precarious existence with the Apaches. The San José mine, known also as the Carumina, was operated fifty or more years ago by a Spaniard, who removed the water from the old workings and succeeded in taking out a lump of ore weighing several arrobas (25 pounds), which yielded 112 ounces (14 marcs) of pure silver, when his pumping apparatus broke, and in several hours the mine refilled with water, and the explorer did not have sufficient means to secure the additional pumping machinery required. But a few years ago a company, composed principally of Mexicans, was formed to work the mine, actuated by the result of the Spaniard's attempt, combined with the statements of the old inhabitants that, when abandoned, virgin silver was being taken from its vein and its ores yielded $1\frac{1}{2}$ marcs (12 ounces) to the arroba. They sank a vertical shaft 210 feet, and supposing they were below the old workings, ran a frontoon 40 feet towards the vein and *into* the old workings, when, the members of the association becoming dissatisfied with each other, the enterprise was abandoned. It would seem that this was one of

those enterprises made unfortunate by incapacity and grievous errors in management, and abandoned when the realization of hopes was almost attained. The openings had again filled with water during the suspension of operations, and I did not see its lower workings; yet I learned sufficient to satisfy me of the value of the mine. The vein occurs near the principal line of contact between the secondary stratified, prior to the uplift of this region and the hypogene masses of the period of elevation. The vein matrix is *caliche*, a gray, earthy and sometimes ferruginous deposit, and a silicious clay, with barytes. The ores are the horn silver, accompanied by native silver, and sometimes, though not frequently, with bromide of silver. From my investigations I formed a very favorable opinion of this mine, and I think that 30 or not more than 40 feet additional depth in its vertical shaft would place it below the abandoned workings; so it would require but a small sum to thoroughly test it.

On the next morning, shortly after leaving San José, we came upon a place on the roadside where a poor fellow (a native) had been shot dead during the night or at an early hour in the morning by a lurking foe. It was supposed that Apaches or bandits did the deed, though neither inquiry nor pursuit were thought of. We crossed and recrossed the Sonora river many times during the day, and passed several haciendas and arable plats, some of considerable extent.

URES.

Ures, the present capital of Sonora, is picturesquely situated in a valley of considerable extent on the Sonora river, and is entered through a delightful avenue several miles in length, shaded by stately elms, maples and cottonwoods. In the environs are the extensive haciendas of Santa Rita, Guadalupe, Molino and Realita, and others, the soils of which

are very fertile, producing the cereals, sugar, cotton, tobacco, fruits, &c. These lands are subject to overflows, which are beneficial, acting as fertilizers, though they sometimes extend to the streets of the town, threatening it with inundation. The town in itself has nothing to attract the seeker of the strange and curious; it is pretty and quiet in its rural retirement, has regular streets, closely built on either side, with residences not elegant, but possessing an air of comfort. The inhabitants are the best models of indolence, patience, poverty and good nature I have seen; they may have been schooled to this by the several bombardments which have defaced many of the buildings with bullet marks, and by the knowledge that they are ever an easy and helpless prey to Liberal, Imperial, Apache or bandit. Ures was the former retreat of the *elite* of Sonora, who sought it for its tournaments, church processions, bull fights, and other divertisements, to while away the days and get rid of their surplus bullion; then, it was only the gay and happy and rich who gathered within its shelter. Many of these old-time visitors yet come, but they come as the survivors of frontier towns who have witnessed the slaughter of their families and friends and the destruction of their property by the Apaches, and have fled from their ravages, or, often, from the merciless persecutions of their own people. Its population numbers about 5,000. The climate during the winter is genial; in the summer months it is hot, and this section is often visited by scorching winds, which penetrate every nook, and make life almost unbearable.

The state of affairs in Ures was not more satisfactory than in Hermosillo, though the citizens did not seem to have the same interest in the result. We could get no definite information concerning the condition of the road before us, though there was no scarcity of rumors. An Imperial Mexican force was stationed in the town, under command of Col.

Salvador Vasquez, commander-in chief of the forces in Sonora; and we called upon him without delay. He declined to grant us either an escort or a pass beyond his lines, and pleasantly vouchsafed the information that "did he meet us on the road beyond the town, it would be his duty to relieve us of our weapons and arms, that they might not fall into the hands of the enemy, though while within his lines we were safe from molestation." Discouraging as was this intelligence, we secured a pack mule and a few needed supplies, and on the 21st left, with the view of following up the Sonora river.

CAJON DE URES.

Three leagues from Ures is the hacienda of Puerta del Sol, and but a short distance above we entered the "Cajon de Ures," through which the waters of the Sonora wind their dubious way. This cañon is three leagues in length, hemmed in on either side by lofty mountain ridges, which in many places came up so closely as to leave but a narrow water-course between solid and precipitous granite walls that shut out the sun-light and make the passage dark, gloomy and forbidding. Dense thickets of mesquit chaparral cover the mountain sides where they do not fall precipitously away, and huge bowlders are suspended seemingly on crumbling points, waiting but for a willing hand to send them laden with destruction into the narrow gorges below. No place is more grand, none need be more wild. But a few years ago—not over twenty—this was the favorite haunt of the Apache and bandit; and it has been the scene of many combats, the victims of which found graves beneath arching cliffs or under piles of loose rocks thrown up by thoughtless hands. Even at this late day deeds of violence are of almost daily occurrence, and the traveler reaches the terminus of the cañon with a feeling of intense relief. And as if to

give intensity to our thoughts, when in the middle of the cañon we stumbled upon the carcasses of a number of cattle, which, with their drivers, several in number, were butchered only the day previous by Apaches. The men were laid out under some shrubbery, and covered from view with brush and grass. I was surprised in noting the frequency of rock piles on the road from Ures. I counted twenty-nine in a distance of nine miles, and have seen as many in a league. These are ever a feature on the trails in Sonora, occurring with frightful frequency; they mark the graves of those who have died violent deaths.

CACHORA.

On leaving the cañon we met several parties of refugees, fleeing from their homes to Ures, and learned from them that the advance of CACHORA'S Liberal force was a number of leagues above, coming down the river, sacking towns and haciendas, and destroying produce and cattle. At Puertocito, ten leagues from Ures, we came suddenly upon some fifty of them, seemingly taking them by surprise; and while they made such movements as manifested an intention to surround and attack us, we lost no time in retracing our course, following a mountain trail a part of the way to avoid the scouting parties whom we suspected might be on the river road. We reached Ures the same evening, having journeyed twenty leagues and crossed and recrossed the Sonora river 130 times. On the following morning the Imperial army officers favored us with the intelligence that a party of thirty Imperial cavalry had been despatched after us, with instructions to overtake us and secure our animals and weapons. We could only have escaped them by taking the mountain trail. We were not disheartened by our failures, and, learning of an Apache trail which pursued the mountain range east of the Sonora Valley, we determined

to follow it, and secured two Oputo Indian guides to accompany us a single day, to point out the trail to the mountain summit. When we were on the eve of starting they demanded the sum of thirty-two dollars for an outfit alone. I did not accede to the demand, and learned afterward that had we taken this trail we would have fallen into the meshes of those we desired to escape from.

WITH IMPERIAL FORCES.

We determined to venture forth on the only untried way, viz: to Matape, a day's journey to the east, and thence to Tepache, Oposura and Fronteras. But a few hours before our departure, however, intelligence came that the forces stationed there had revolted, and were sacking and destroying almost to Ures. Then we learned that Colonel VASQUEZ would leave with his force on the following morning to give battle to CACHORA at Puertocito. Acting on this intelligence, I requested the Colonel and his principal officers to honor me with their presence to supper. They gladly accepted, and herein I found the vulnerable point in Mexican character. Before we parted for the night it was understood that we should accompany the Colonel and his force to Puertocito, to witness the battle; with permission to continue on, did circumstances permit, and I had a letter from the Colonel to commanders of Imperial forces in the State, recommending us to their consideration, and to a pass through their lines without molestation; though, in this connection, the Colonel was honest enough to advise us to avoid, if possible, the forces of either party, if we desired to retain our arms and animals, giving us in explanation a forcible though not very favorable view of the status of Imperial and Liberal.

On the morning of the 24th we retraced our steps up the Sonora river, this time in the van of the Imperial army. When six or seven leagues out, scouts brought the intelli-

gence that CACHORA had passed over the Oposura trail, and was but two miles distant, moving in a course by which he could either fall upon Ures or reach Matape. By an hour's march VASQUEZ could have forced his enemy to the battle he had so much desired; but, for the moment, his troops were panic-stricken, and he determined to proceed on to Puertocito, and there await reinforcements. Taking advantage of this panic, and with the momentary consent of the Colonel, we struck off in an east course to intercept the trail to Opo ura, now free from the enemy. We were congratulating ourselves on our escape, when a party of twenty-five Imperial cavalry filed across the trail in advance, and presented a request from VASQUEZ for us to return and see him at Puertocito. We could only comply, though with misgivings. We found his forces distributed as for battle, and he had learned additional particulars concerning the roads; though we could not perceive wherein they particularly interested us. It appears that the impression had gotten abroad among his not over-zealous soldiers that we had espoused their cause—and these people have astonishing faith in the fighting qualities of Americans—and our disappearance caused them to believe that we had gone over to their enemy, CACHORA. To remove fear and allay excitement we were recalled, and would likely be retained. We were careful to pitch our camp beyond the picket lines without exciting suspicion, and again tried the supper dodge, so successful at Ures, but this time with a different purpose in view. The result you will know when I remark that at 9 o'clock we quietly saddled up and stole cautiously away, happily without causing alarm, and rode hastily for Babiacora, seven leagues distant, where we arrived in the middle of the night. The people of this place imagined we were of the contending forces, and it was only when we resorted to threatening that they gave us shelter.

On the 25th we reached Heupaca, eight leagues distant,

where we found refuge in the ruins of a deserted nunnery. There was much to interest us in this necessarily hurried ride up the Sonora, had we been in a position to tarry and investigate and enjoy. Everywhere on the road were visible the ravages of civil and barbarous warfare, and terror, misery and the haggard aspect of want were visible in the few faces which were seen stealthily peering at us from desolate haciendas or hidden coverts in the mesquit chaparral. Heupaca had been eleven times in the hands of the contestants in the past month, and the ranches in the neighborhood were stripped of animals, grain and the necessaries on which the people depended for subsistence, and such things as could not be carried away had been destroyed. The people were of a better class than is usually found in the frontier towns, intelligent and to an extent educated. Dr. EDMUNDSON, an American resident, called upon us; it was the first opportunity he had had to speak in his own language for a year. He was in poverty, and related his experience. His animals, arms and money were taken from him five several times; he had been a prisoner of both parties; was tied up and ordered shot by the Liberals, and forced to stand in the van of the Imperials during a battle; his only desire was to escape from the country, and this he could not do, as both parties were his foes.

SONORA RIVER AND VALLEY.

In this ride up the Sonora river and valley I beheld sufficient to have me desire to make a more careful investigation. In later wanderings I learned some of the facts which are here given. The river Sonora is next in importance to the Yaqui, Mayo and Fuerte, though it calls for quite a stretch of imagination to conjure it into a stream of sufficient extent to deserve the appellation of river. It has its rise in the mountain ranges near the Arizona line, where we

find it formed of branches. Below the presidio of Bacuáchi the branches unite, and the stream thus formed flows in a southerly and south-westerly course, until its waters are lost in Siete Cerritos, west of Hermosi lo. In the cajon of Arispe, below the town, it forms a considerable stream, and so also in the cajon of Ures. At intermediate points much of the waters lose themselves to view in the loose river beds, or are carried from their natural channel in *acequias*, to irrigate the agricultural lands. The river is confined in its course by parallel steppes of the Sierra Madre, which are lofty and precipitous even to sublimity. These steppes or ranges are successively the third and fourth from the mother chain—the intervening ones being the San Juan del Rio and Nacosari ranges—and are bolder and more prominent than the parallel ones occurring farther west, and not so much so as the eastern ones. After leaving the cajon of Ures, in coming up, there are bottom lands bordering the river, which are of considerable extent and surpassing fertility. This is considered by some authorities to be the garden of Sonora, though it would perhaps be doing injustice to other fertile sections to give it such a proud distinction. The ranges on either side of the valley are eminently metalliferous in character, and among the most interesting of Sonora's mineral regions. Despite the investigations of many years and the expenditure of labor and capital—which in numberless cases, however, has been munificently returned—little that is *practically* beneficial has been determined.

Besides the settlements which I have already named are the towns of Banamachi, Siniquipe, Babicanora, Arispe and Bacuáchi, and many large haciendas. The entire population of the valley, on this my first visit, I estimated at about 3,000. There are abundant indications from the ruined reáls and haciendas, the crumbling walls of churches, fortresses, reduction haciendas and ranches, the acequias

that once supplied irrigation, and the now untrodden pack-trails winding around the mountain hights, that at a distant day it had been very populous; but with the expulsion of the Jesuits and the continued inroads of the Apaches came the ruin and desolation now everywhere visible.

BABIACORA AND HEUPACA MINES.

The mines of San José de Gracia have been mentioned. In the elevations surrounding Babiacora and Heupaca are to be seen the old workings of mines, now filled in with debris or long since brought to ruin by the destructive hands of gambucinos; and regarding which the searcher can learn nothing beyond what he may see of the surrounding formations, the regularity of the vein walls, and the seeming mode of occurrence of the veins and character of ores, and mayhap the ruins of furnaces and arrastres. Not even a speck of the poorer ores may be found in the debris, which has been searched over many times by the gambucinos. Tradition, however, is fluent as to the former history of these abandoned localities, and every little settlement has its well-preserved tales of the notable features of its own neighborhood. In them is a fund of valuable information not otherwise attainable, many times clogged by superstition, rumor or fancy; though by continued questionings or a personal comparison of facts, they may be recognized and sifted from the truth. Two leagues above the ancient hacienda of Conception, in a rounded hill west of the river, are a number of mineral veins occurring in a feldspathic porphyry and of limited width. But one has been worked to any extent, the metals producing a marc to a marc and a half per carga of 300 lbs. It was abandoned because of Apache depredations, and is now only visited occasionally by gambucinos.

In the immediate vicinity of Babiacora is an abandoned mine—supposed to be Dolores—seemingly once extensively

worked; its ores produced as high as two to three marcs per carga, and, in character, were the resultants of the chemical changes in the deeper sulphureted ores, and were easily smelted. There are other ancient openings, deposits of debris and slag, though I could ascertain nothing definite concerning their occurrence. The ancient excavations in the Cerro Gordo are yet visible; the vein is found in a lofty ridge, and the first openings were seemingly made from the outcrop. Much debris had fallen into the old openings, and where not filled they were in such a frail condition that we did not attempt the descent. That these openings were extensive and to considerable depth would appear from the immense banks of debris surrounding them. The vein seems to have been very irregular, varying from a few inches to several feet in width, with the ores occurring in pockets connected by strings of the metals; they were the changed forms of the sulphurets. The mine is said to have yielded largely. It was first abandoned because of Apache depredations; parties have since made efforts to reopen it, but through the same causes they did not succeed.

The San Filepe, a little to the south-east of Heupaca, is yet pointed out as a mine of wonderful richness; it is said that when abandoned because of the frequent butcheries of its miners by the Apaches, it was producing pure silver in its lower galleries, while its ores were astonishingly rich in gold and silver. Three several attempts were made to clear away the debris which had entirely filled its openings, but without success, through want of sufficient funds.

BANAMACHI MINE.

The Banamachi mine is two and a half leagues north east of Banamachi, and is referred to by modern authorities as "the richest mine discovered in late years." I think it deserves the appellation. The mine was first successfully ope-

rated some ten years ago. In developing it the discoverer impoverished himself and those of his friends who had faith in him; and when on the eve of being forced to abandon it for want of money, he struck metals so rich and abundant as to make him exceedingly wealthy in a few months. It was said by those who should know, that over two millions of dollars were taken from it the first year. Since the death of the discoverer, which occurred several years ago, the ores have been worked on shares, being extracted and taken to Banamachi to be reduced, and giving large returns to the workers—so large indeed that the present owner (widow of the former proprietor) has determined to discontinue this method of working. She informed me that for an expenditure of less than $2,000 in conducting the mining operations the past year she secured a return of $10,000, and that in the same proportion has been the result for several years. The location is a lofty mountain, and the outcrop is bold. The vein has been opencast from its crest to a depth of 150 feet, and this cut extends through the mountain. The present operations are carried on through an incline tunnel, 200 feet in length, below which four *labors* are opened in the vein. The deepest opening is 100 feet below the bottom of the incline. The encasing formation is a feldspathic granite. The vein is strong and well defined, with a gangue of ferruginous quartz; it is about eight feet wide, and its ores are gold and silver sulphurets. Near the surface the gold was very abundant, though at the present depth silver predominates. The ores are well disseminated throughout the vein matrix, and are rich in lay, quantities of the vein material having yielded returns of $1,500 to $2,000 per ton. Two of the *labors* are in excellent rock; the others contain average ores in abundance, and large quantities of ores were on the surface awaiting reduction. The merits of this mine are its well-defined vein, abundant and rich metals of simple

character for handling, and advantages for operating cheaply and successfully. I consider it in these views the best mine in the Sonora ranges.

BABICANORA MINE.

Babicanora, one of the most noted mining districts in Sonora, occurs in the sierra east of the Sonora river, and four leagues from Siniquipe. The mine of Babicanora was first opened and worked by Don Alejo Conde, who, on finding its ores very rich, established a large hacienda for their reduction below Siniquipe. He worked the vein until the sulphuret ores were reached, and being unable to beneficiate them he abandoned the mine. It was shortly after denounced by Don Salvador Moreno, who discovered a *bonanzo* of surpassing richness, which he continued to work until his death. It was now abandoned for some time, even by gambucinos, on account of the continued inroads of the Apaches; and some years since was taken hold of by the Camou Brothers, and other wealthy merchants of Hermosillo. They ran a socaban (tunnel), eight feet by seven feet, from the base of the hill, with a view to cut and intersect the vein below the lower workings. In the lapse of five years, and when they had attained a distance of 500 varas, they discovered that they had run through the vein and beyond it a distance of 250 varas. There are three *labors*, respectively 20, 40 and 60 feet below the tunnel; though the ventilation is so imperfect that it is impossible to prosecute work in them. The vein is about five feet wide, the ore black sulphurets, and of a fair lay. The machinery for beneficiating works had been purchased, and a portion of it was at the mine, though no effort had been made to erect it. Work on the mine was suspended in December, in consequence of the civil strifes, and no effort has since been made to resume. In the management here, immense sums have been squan-

dered through folly and ignorance, and the operations will ever be attended by heavy expense.

EL CARMAN MINE.

El Carman occurs on the opposite side of the mountain; it has been worked extensively and is celebrated for its richness. The matrix is quartz, heavily disseminated with native silver and ores of silver—black sulphuret with gray sulphuret—in the deepest openings. It is one of the most ancient and extensively worked mines in the State; and tradition has it that when given up, large amounts of native silver were being taken from it. The discoverers abandoned it with the departure of the Spaniards, taking with them their riches; and for many years it was worked solely by gambucinos, who ruined the old workings by removing the pillars. In later years it was reopened, and large quantities of native silver and valuable ores taken from it; the ores yielding as high as six marcs to the carga of 300 lbs.

There are also in this *mineral* the ancient mines of Granadito, Esperito Santo, Vermosira, San Francisco, Gehas, Philetas, Mina del Clavo, and many others, a few of which have merit. In the vicinity of Arispe there are a number of ancient mines, the most noted of which occur in the sierra San Pedro; they have, however, been so long abandoned that tradition has ceased to be a means of information concerning them.

TO CUMPAS.

On the evening of the day of our arrival at Heupaca intelligence came that JANORI, an Imperial Indian, with several hundred Oputo Indians were in the vicinity of the town, marching upon it. Of this officer we had been particularly cautioned by VASQUEZ and his officers, who advised us to avoid him at all hazards; and to do this there was but one

door of escape. An indistinct trail crossed the mountain ranges east to Cumpas, on the Oposura river. The trail was infested by Apaches, and considered so dangerous as to be traveled only by large parties, and even then in the night. We required guides to point out the trail, but could not get them, so on the morning of the 26th we started forth alone, and happily struck the trail and succeeded in following it. We found it anything but a good one, the ascents and descents of the mountains being very precipitous; and several times, as if by interposition, we were made aware of the presence of skulking enemies in time to avoid them, or prepare for an encounter which could but terminate fatally to us. We were glad, after a wearying and watchful ride, to reach Cumpas in the night. Two leagues from this place our trail led us through a beautiful valley, the site of two Indian massacres, the victims of the first numbering 30, and of the other over 40. Over 200 persons in all have been killed by Apaches on this trail, within the memory of man.

CUMPAS.

Cumpas was for the time above and removed from the field of contest of Imperial and Liberal, and promised to have a much needed rest from the terrors of war, though I found the government of the civil affairs here and in the neighboring country solely in the hands of the Imperials. I had become so familiar with the importance of this region, in a mineral and even in an agricultural view, that I determined to make some investigation into its merits before proceeding farther; and as Cumpas was in a central position in relation to the most noted mining districts, and so situated that I could draw needed supplies from it, and make short excursions, I made it my head-quarters for the time.

OPOSURA RIVER AND VALLEY.

The Oposura river, on which Cumpas is situated, is a

branch of the Yaqui; it is one of the considerable streams of Sonora Alta, and has its rise in the elevated ranges near Fronteras, whence it flows through the valley and cañon of Nacosari until it disappears in the quaternary at the head of the main valley. Its waters strike the granitic beds just above the hacienda of Ojo de Agua, a league above Cumpas, and continue in a south-easterly course, intersecting the Yaqui river below the town of Suaqui, in latitude 29° 42′, longitude 109° 20′. On either side are parallel mountain ranges, high and lofty, the intervals between which are plains having a gradual descent until the river bottoms are intersected. This Oposura valley, varying in width from one to six leagues, is not as extensive as the Sonora on the west, or the Yaqui on the east; though it is noted for its exceeding fertility, and adaptability to the production of cereals, cotton, sugar cane, and tobacco of superior grades. Though now of limited note as regards its settlements and agricultural products, it was, without doubt, in a very advanced and flourishing condition before the expulsion of the Jesuits; more so, perhaps, than any portion of the State except the San Juan del Rio section on the Yaqui river.

Bourne, writing of this valley in 1826, mentions ten towns with a population of 10,600 souls, and an annual product of 20,000 fanegas of grain, 180,000 lbs. brown sugar in cakes 105,000 lbs. soap, 2000 horses, 4000 blankets, and other items. At this time (January, 1866,) its towns and populations were as follows: Batuc, 100; Tepache, 200; Oposura, 1,000; Jacori, 100; Cumpas, 500; Ojo de Agua, 50; other haciendas, 100; in all 2,050; and its products were not even in a similar ratio, for in all of these places there were at least 17 females to every male, and in one place the proportion stood 29 to 1. The cause of this alarming condition of these people may be found in the fact that this

valley has suffered, and is suffering, very severely from Apache depredations—not a single day passing but what they make their appearance at some point in it. Its people have also suffered very severely in the present strifes of Liberal and Imperial, Cumpas alone having lost not less than 200 men in this way, and the other towns in proportion.

TEPACHE AND OPOSURA MINES.

In the vicinity of Tepache occur a number of old openings of limited extent, and vein outcrops carrying surface indications of copper and silver—a fahlerz ore—and deserving more extended investigation. Near Oposura are the Toinbabe gold placers, and near Cumpas and Jacori others, which yielded well but are not now worked on account of the Apaches. A number of abandoned and debris-filled openings are in the hills surrounding Oposura, though nothing satisfactory is known of their former history. One, in particular, is shown as having been covered over by Apaches to hide its existence, so rich had it proved; it *has* the appearance of being artificially covered over.

TALCOSE DEPOSIT.

In this vicinity is the most wonderful deposit of talc of a steatite species I have seen. It occurs in an immense mass whose extent has never been determined—with neither stratified parting nor cleavage, and is most exquisitely variegated. Considerable quantities of it were taken away for the manufacture of ornaments; and many articles of furniture were made from it, some of which graced the gubernatorial mansion in Ures. It is of a very fine texture, may be sawed out in blocks of any desired size, and turned in a lathe, or formed into tubes by boring. When subjected to heat it becomes a beautiful transparent, and

for casings of vasos or smelting furnaces it is invaluable. It is one of the things worthy of attention.

SAN JUAN DE SONORA.

Four leagues south-east of Cumpas is the ruined hacienda of San Juan de Sonora, the ancient capital of Sonora, and in its immediate neighborhood the mountain and *mineral* of the same name. The mountain is isolated and perhaps a mile long, and the mineral veins cross it at nearly right angles. There are 14 mines upon it, only several of which deserve the appellation. They were very extensively worked, and according to tradition yielded large amounts of treasure. The entire mountain seems to have been mined over for the thin plates—often not over two inches in thickness—of almost pure metal. I was very careful in my investigations of these abandoned mines, as I had been favorably impressed with them through report. The principal mines are the Santa Ana, Rosario and Cata de la Agua; the others I determined at once to be *threads of metal*, which ceased to exist in a depth of two to ten varas. The Santa Ana has been open cast a length of perhaps two hundred varas, and its deepest openings are one hundred and twenty varas. The encasing formation is a hypogene, and I noted on the upper end the occurrence of a diorite which has completely broken the vein off. The vein is two inches to a foot in thickness, and its ores are chlorides, exceedingly rich. From appearances in the lowest attainable depths, I was inclined to believe that the fissure was seriously contracting as depth was attained. The Rosario vein was similar to the Santa Ana, though it had not been worked to as great depth; the Cata de la Agua possessed no regularity, and indicated that it had pinched out at a depth of fifteen varas. The Santa Ana has seemingly been worked to water. I believe that these workings formerly yielded immense sums, but I also

believe that their veins are too uncertain in continuance and their ores too limited in quantity to warrant such expenditure as would be necessary to make their treasures available.

NACOSARI.

Ten leagues north of Cumpas is Nacosari mining section, (described in my Geological Report, *ante*) and the ancient reál of Nacosari. I know of no more delightful spot than this could have been when in the hands of the Jesuits. All is now crumbling ruin; but in the fertile valleys which since their day have grown over with dense thickets of mesquit, walnuts, oaks and sycamores, we find perpetuations of the cultivated Jesuit fathers in peach, pomegranate and fig trees, which blossom and bear fruit, with none to gather. When in their possession, 30,000 head of cattle, horses and mules roamed its mountain sides.

DENOUNCEMENT OF RANCHES.

In the investigations conducted by myself and assistant we were strongly impressed with the merits of two localities, viz: the "San Juan del Rio Ranche," on the Yaqui river above Oputo, and the "Nacosari Ranch," 10 leagues north of Cumpas; and determined to take the preliminary steps to a proper denouncement of them.

In consequence, I appeared before Don Gregorio Moreno, Prefector of the District of Moctezuma, at Oposura, on Jan. 31st, and in conformity with law and form made a formal denouncement of them. The Prefector accepted my denouncements, attached the usual notices to claimants to appear, ordered the denouncements and attached notices to be published in the *Periodico Oficial* newspaper for three successive weeks, and appointed Feb. 5th, as a day of investigation into titles of claimants. The three numbers of the *Periodico Oficial*, dated respectively Feb. 16th and 27th, and March 2d, in

which the denouncements were published, are herewith presented; and the accompanying document marked (A 1) is a certified copy of the original denouncement and attached notice of the Prefector, the originals having been forwarded to the Minister of Fomento, at Mexico.

[I will here remark that as these and all other documents relating to the location of Grant, etc., occur in the Spanish language, I have translated them as correctly as it is possible to do; and these translations accompany the originals, and are correspondingly marked, that you may more clearly understand the course I pursued.]

While I denounced these ranches subject to my investigations in other fields, I did so only after I had *thoroughly satisfied* myself of their favorable character and extent, the value of their mineral deposits and those in their neighborhood, the many advantages and facilities for mining enterprises which they possessed, and their adaptability to the purposes which were had in view in securing possessions in Sonora. And in designating the boundaries of the tracts, I placed them so as to include *only* such lands as were useful, necessary and valuable.

JOURNEY NORTH.

As soon as the conclusion of my investigations in this section and my wounded limb would permit me to proceed, I determined to penetrate the Indian country north and west of Cumpas. I saw the necessity of examining its mineral ranges and of making myself familiar with the country bordering on Arizona, and, particularly, the mineral and other features of Planchas de Plata and Nogales. The country was in no fit condition to undertake a journey of this nature. There was but a single settlement on my route —that of Bacuáchi—numbering a few outlaws; the balance of the country was in undisputed possession of the Apaches,

unvisited, and almost unknown, and even spoken of with dread.

We left Cumpas on the morning of the 4th of February, accompanied by our two servants and a single additional native. The people of Cumpas accompanied us *en masse* a league on our journey, and parted from us firm in the belief that we were destined to be Apache victims. I must confess that I was not very sanguine of the result. It is needless to give a detailed statement of the occurrences of this journey; suffice it that each day had its adventures for our little party, none of which were of a pleasant nature, and very many having a very serious aspect and threatening fatal terminations; and that from the moment of our departure until our return, we were surrounded by enemies waiting but for a single act of carelessness or inattention on our part to make us feel their presence.

BACUACHI PRESIDIO.

The presidio of Bacuáchi is 23 leagues from Cumpas in a north-west direction; it is situated on an elevated plateau overlooking the West Sonora, which branches several leagues below the town. A more desolate place than Bacuáchi appeared at this time could not easily be conjured into existence; and, indeed, Bacuáchi of ancient glory had long since ceased to exist. Ruins of buildings were scattered over a considerable area; and but a few adobe piles, seemingly once inhabited structures, and huddled around three sides of a lonely plaza, showed indications of being occupied. It was with some difficulty that we could induce a possessor of one of these mansions to give us the use of his corral for ourselves and animals. Bacuáchi was in former times one of the most considerable towns of Sonora Alta, having as late as 1830–'40 a population of 2,000, besides a garrison of several hundred Oputos, and possessing considerable riches

in cattle, horses, sheep, &c. Through the incursions of the Apaches it was soon stripped of these; and becoming emboldened by the seeming lethargy or terror of its people, these enemies made systematic attacks upon it, killing off large parties of its people who ventured forth, and committing massacres within its walls, until, at the time of our visit, it contained not more than 50 people, who called themselves Liberals, but were really bandits, having an unenviable reputation in the southern towns. A more cut-throat looking crowd than those who surrounded us on our arrival I am not desirous of meeting. They became so impudent in handling our effects, and inquisitive in prying into our purposes, that I feared unpleasant results before our departure. What words of warning would not do, a judicious handling of our weapons effected; and though we kept guard during the night, we saw no more of the Bacuáchi *hente*. The climate of Bacuáchi is cool, and early frosts occur which destroy the more tropical products. Its valleys produce a superior wheat and corn; the people, however, are too indolent to cultivate them to extent, but are contented to live principally upon the various wild fruits of the cactus and mesquit; and the acorn of the oak is their chief subsistence a goodly part of the year.

BACUACHI PLACERS.

In the vicinity of Bacuáchi are extensive diluvium beds, which, before the expulsion of the inhabitants, were extensively worked for their gold deposits. Large quantities of this metal were taken from them, and numbers flocked to the locality on their first discovery. The gold occurs in coarse grains or water-worn nuggets, which have been found weighing 10 to 20 ounces. In late years parties worked these placers, receiving handsome returns; but they ever ran the risk of being cut off by the savages, and soon de-

serted them. In the sierras surrounding are many silver and copper veins, which are not sufficiently explored to determine anything definite concerning their nature, though their outcrops contain very favorable metalliferous indications.

Shortly after leaving Bacuáchi, we surprised a party of CACHORA's mountain gang so completely that we got between them and their animals which were grazing a few rods distant from them, and their guns being lashed to their saddles we of course had the advantage. They were eleven in number, and showed themselves *acquainted with our every move and purpose*. It was a grim meeting, and we breathed freer when it was ended, though we were surprised they did not follow us. Our route was very circuitous, following the beds of what had been streams, and crossing mountains in almost every course. We passed several deserted ranche houses, unroofed and fast falling to decay. The country through which we traveled was a succession of broad cañons, rounded elevations and open *mesas* [table lands] interspersed with clumps of mesquit, and covered with grasses. Water was very scarce.

OJO DE AGUA.

The Ojo de Agua ranche—20 leagues from Bacuáchi by the route we followed, though much less in a direct line—is one of the finest grazing ranches in the State, and at one time possessed 20,000 head of horses, mules and cattle. I have rarely seen a more beautiful expanse of country—stretching like a vast undulating prairie afar to the north, with here and there a conical shaped hill crowned with live oak intercepting the view. Its grasses are the mesquit and gráma, the latter abounding and already green; and a fine stream of water courses through the lands. The buildings, which were spacious and elegant, are fast falling to ruin.

Wild horses and cattle roam over the lands undisturbed, and but little is now left to denote that man reigned here in former days.

LA CANANEA HACIENDA AND MINES.

Three leagues over the mesas of Ojo de Agua brought us to La Cananea, the site of Governor PESQUEIRA's mines and reduction hacienda. The hacienda—with its rows of furnaces and stacks of chimneys, and its houses surmounted with watch-towers, and turrets pierced for musketry—presented the appearance of an establishment of the feudal times. We found all desolation and decay, and could see the evidences of the hurried departure of its former occupants. The hacienda is cheerfully situated, and the houses and other improvements are substantial. The site commands within a close circuit the elements essential to the successful conducting of mining operations, &c. A small though permanent stream of water courses through the valley, which possesses some arable lands; and timber for fuel is on the surrounding mountains. A 12-horse power engine with boiler was standing in perfect order. This was a matter of surprise, as the engine house was erected of California lumber, and the roving Apaches ever delight in setting the torch to deserted establishments. Twelve smelting furnaces were also in good repair.

The mines of La Cananea are in the surrounding ranges, which here attain a considerable hight. It was my wish to give them careful and extended examination; but we had visited only a few of the old workings, when our moso—whom we had stationed on a neighboring eminence, as was our custom, to apprise us of anything suspicious—gave the alarm that Apaches were on the peaks, commanding the cañon, above and below us. We suspected these to be of the party who had been following us, though we soon had

evidence of the near presence of other parties. By almost superhuman efforts in dragging our horses and ourselves over the mountain ridges, we avoided the trap they had set for us, and by use of the greatest caution and watchfulness eventually escaped from them.

The formation of La Cananea is strongly mineralized, and in almost every direction throughout the mountain one may stumble over fragments of outcrop and vein indications. There are, I believe, seven mines formerly worked to a considerable extent, besides openings in a number of others. Of these I saw but a few, though from them I gained a partially definite knowledge of the features of the occurrences. The formations consist principally of granites, metamorphic limestones, and palæozoic slates, with occasional beds of quaternary. The different series show irregularities and faults in their occurrences, which would at once have me decide that they have been greatly disturbed. We here find the more southerly of the volcanic peaks which are so frequent yet farther north, and denote the latest periods of disturbance. The metalliferous veins bear external evidences of extent and *a degree* of permanency; though on closer inspection into the lay of the encasing rocks and occurrences of gangues and ores, we can only form the conclusion that they are not true veins; neither are they simply confined to the surface, as their working is evidence, but form a medium between the two extremes. It is possible that the zone of disturbance may not exist to great depth, and that the vein fissures extend into the undisturbed underlying rocks. I am inclined to think differently, however, as I find no evidences of changes visible in the deeper workings, though I was obliged to judge simply from the appearance of the rocks taken from the openings. The zone of disturbance may extend to a depth of 200 or 300 feet, and upon meeting the change of rocks terminate there. If, however, the

vein fissures penetrate the undisturbed formation, the ores will suffer a change in nature, throwing aside much of their copper and taking the form of complicated ores of silver. The present existing copper ores are principally gray sulphuret and red oxide with native copper; and of silver ores, chloride and argentiferous galena, accompanied by carbonates. They occur in a ferruginous quartz with barytes, are easily reducible, and their yield is not large. The veins are three to five feet in thickness, which would lead me to believe that they will give a fair supply of ores. To determine, in a degree, the question of continuance, tunnels may be run in from the base of the mountains to cut them at a depth of 200 to 300 feet below their outcrops. To compensate, however, for the uncertainty concerning their continuance, this section contains numerous other veins which would furnish considerable ores at comparatively little expenditure for their removal.

Between Cananea and Santa Cruz, a distance of eighteen leagues by the route we traveled, the country becomes more level, with little wood and a very limited supply of water. We passed the usual number of deserted haciendas; and when in the vicinity of Santa Cruz, met a small party of Liberals, who manifested no desire to molest us. We arrived at Santa Cruz in the night; and only after the greatest difficulty secured a corral for our animals and a tumble-down adobe hut for ourselves, it being at first supposed by the inhabitants that we were the advance of one of the contesting parties, of whom they have a wholesome terror.

SANTA CRUZ.

Santa Cruz is the extreme northern settlement of Sonora, and is two leagues from the Arizona line. It is situated on a barren plateau overlooking a river, or more properly creek, of the same name, which has its rise in a mountain spring

north of the valley. A dilapidated church, with a number of adobe huts confusedly grouped around it, comprises the town, which has a population of several hundred Mexicans. The river valley is pretty and quite extensive, and the grain produced here finds ready sale at inflated prices to the United States forces and the Arizona mining establishments. The demand is greater than the supply; and though we made diligent search at every house in the town for a few pounds of flour, offering any desired price for it, it was not to be had. After fasting until we appreciated the luxury of eating, we secured a corn *tortillo*—a pancake about the size and thickness of a dinner plate—for which we paid three dollars.

In the presidio of Santa Cruz are the ruins of Cocospera and San Lazaro, old Jesuit missions, and several other towns of good extent, but long since deserted because of the Apaches. This presidio has suffered fearfully from the depredations of these savages. Santa Cruz has the peculiarity of being cold all the year round, and we found the heavy folds of our blankets anything but disagreeable. This peculiarity of climate is caused partly by the position of the surrounding mountains, occasioning at all times an unexplained suction of winds, and partly because of its elevation, it being a dividing ridge on which the waters of Arizona and Sonora take their rise, the first named flowing north and the others south. The inhabitants of Santa Cruz are the perfection of indolence and filth, vice and deceit; they have all the worst characteristics of Mexicans with none of their better ones. We remained here sufficiently long to make some desired investigations in the vicinity; and thence continued, by way of the Mowry and San Antonio mines, to Fort Mason (Calabasas), twelve leagues distant in a north-east course.

CALABASAS.

On the night of our arrival at Calabasas, the Apaches—some 40 in number, who had been upon our trail throughout our journeyings—followed us into the camp, forced their way into the corral in which the animals of the cavalry force were secured, and succeeded in *running them all off*, though there was a guard on the corral at the time. Our animals were only saved by our refusal to put them into the corral, and by keeping watch over them. We visited Nogales and Planchas de Plata, the latter ten leagues south of Calabasas, and also made some examinations to the west. During our stay at Calabasas we were the guests of Col. LEWIS, commandant at the fort, and are deeply indebted to him for his hospitality and assistance in securing for us provisions for the road, which could not otherwise be obtained.

VISIT TO PESQUEIRA.

We continued to Tubac, and thence to the Cerro Colorado (Heintzelman) mine. Here we found a nephew of Governor PESQUEIRA, who conveyed us to his retreat, two leagues distant. This retreat was in a lonely and almost inaccessible cañon, surrounded by lofty hills upon which sentinels kept watch day and night. We found the Governor living in a miserable adobe hut, surrounded by evidences of great poverty, which we did not wonder at, as we had learned that his subsistence in great part came from Government supplies at Calabasas. In my letter written from Cerro Colorado, on February 13th, 1866, I gave you the substance of my conversation with the Governor, viz.: On examining the Grant from COMONFORT, he declared it to be good and valid, but *he* could do nothing *in an official character*, as regarded placing us in possession of and giving us title to the unclaimed lands I might select, *until peace was restored to Sonora;* that when this was brought about, you would have no further trouble

or delay in securing title to the unclaimed lands I might select, etc.

During our stay at Cerro Colorado the Apaches made a raid upon it, driving away all the animals but our own and a few others.

TO MAGDALENA.

From Cerro Colorado we went south to Arivaca and the Euriguittas mines (possessions of the Cerro Colorado Company), and thence to Sarique, eighteen leagues south. From this place we continued our examinations east and west, again passing carefully over the Planchas de Plata section, which I found more accessible from here, the Pajarito mountain range, and the country bordering on the boundary line. On the road to Magdalena, 22 leagues from Sarique, we saw the usual number of ruins and evidences of a former prosperity. We suffered greatly from want of water, there being a forty-mile stretch without any; and passed a fearful night because of Apaches, who set the grass on fire around us, and made several attempts to surround us. On arriving at Magdalena we were almost worn out with constant watching and traveling, and our animals were in even a worse plight.

TOPOGRAPHY AND GEOLOGY OF NORTH-WEST SONORA.

The topographical features of the country north and west of Bacuáchi and Fronteras in Sonora differ very materially from that composed of the more easterly sierras. In traveling north we find that the mountains begin to lose much of the boldness and regularity which so distinguish them farther south in the ranges, until, above Cananea, they have parted their continuity and are huddled together in groups, or stand out in isolated peaks. Volcanic cones become of frequent occurrence, and their scoriaceous rocks form exten-

sive mesas over the more elevated plateaus and stream-like occurrences in the valleys, or cap the higher ranges. The geological features of the section were no less marked, and in their occurrence they present evidences of the great and continued disturbances and their accompanying changes, which have taken place since the first upheaval. The porphyries forming the controlling elements in the more easterly ranges are here found only in intrusive dikes in the limestones, sandstones and slates of the ranges. The ancient sedimentary strata—previously but chistose clays—are transformed into argillaceous slates in which are inserted beds of sandstone, and these are highly modified by the volcanic heats to which they have been subjected. The limestones are metamorphic rocks which appear to have been primitively the bottom of a cretaceous sea. The palæozoic rocks—micaceous talcose and other slates—are invaded by masses of hypogene rocks, which have raised them from their original position and fractured or twisted them; and the once horizontal limestones are also fractured and raised almost upon end, and rendered crystalline by the irruption of igneous masses through them. These rocks are capped by immense beds of quaternary and conglomerate, and the valleys and footranges are covered with the fragments of the occurring formations.

It were almost impossible to correctly trace the relation, both as to age and position, of these formation rocks to each other; to such a degree have they been metamorphosed, bent, twisted, disturbed and fused. I have rarely seen a section of country so checkered with eruptive faults and displacements, or deformed from its original nature; and there are occurrences here which are diametrically opposed to some theories of geology. The metalliferous veins occurring in the ranges have the same appearances of irregularity and imperfect continuance. Found in the limestones or at their

junction with the crystalline slates, or in the imperfect porphyries, they are affected by each of the successive results of continued and varying disturbances, and lose those marked features which distinguish them in more perfect ranges. The contemporary systems that may have existed on their formation now form tangled intrusions which cannot be unraveled and are cut, broken off, thrown far from their course into differing formations, or altogether terminated by the fractures and upheavals and dikes of the ranges. And as a farther evidence of their segregated nature, their metalliferous ores occur in bunches throughout the linear extent of the veins, connecting through long separating distances by threads of the metals; and the thickness of their fissure occurrences is limited, in a majority of cases being not more than three to twelve inches. As exceptional cases, we find limited ranges which these lateral disturbing influences have avoided, thus giving to them a more regular and perfect structure of their formation rocks, and to their veins the extent, thickness and undisturbed continuance of true fissure veins, with their regular distribution of ores.

PLANCHAS DE PLATA.

I do not consider the Planchas de Plata one of these exceptional cases. On the contrary, its ranges show very marked evidences of continued eruptive disturbances in the mixed and, in some localities, fused state of their formations. I could discover but few indications of metalliferous veins in the lands; several had been partially opened upon and seemingly soon abandoned because of the irregular occurrence of the metals. The veins which I saw were of limited linear extent, their gangues were quartz, and the ores the chloridized varieties, with native silver; their thickness was very limited.

Many excavations have been made in search of the *vein*

or *veins* from which the masses of silver which gave this place its name were taken, but without success, as any one with the least knowledge of metalliferous occurences could have predicted. *Several hundred thousand dollars* have been squandered by different parties in this vain search, and the sum total of returns foots up several small pieces of silver weighing an ounce to several ounces each. The large planchas of silver occurred in a silicious clay, containing rounded fragments of quartz. This clay was undoubtedly a wash deposit gradually accumulated here from surrounding formations, or from distant sections, carried in by water torrents; it would seem more likely that it came from a distance, from the fact of the existence of the rounded quartz pebbles, which could have secured this form only through attrition. The planchas were probably the resultants of intense volcanic heat upon the chemically changed outcrops of metalliferous veins, as the fused appearance and form of these masses would alone indicate; or they may have occurred through a gradual combination of the metalliferous particles washed from the decomposed outcrops of many veins, and brought in contact in their passage to where they were discovered. To continue the search for the *vein* in which they occurred would, to say the least, be a very unwise and unsafe expenditure of money.

MAGDALENA.

Magdalena is a town of some importance from its geographical position. It is on the direct road from Hermosillo to Calabasas, Tubac and Tucson; and since the birth of mining enterprises and the establishment of military posts in Arizona, has become an important point for securing supplies. Large quantities of wheat, corn, panoche, and other products, are sent from here yearly to meet the wants of the northern country. The merchants of Arizona are also beginning to

purchase their goods here, and in Hermosillo and Guaymas, in preference to bringing them at a heavy expense overland from San Diego. The town is pleasantly situated, but shows the usual degree of filth and inanity; the church is the only creditable building in the town.

CUCURPE.

We next determined to proceed to Cucurpe, 14 leagues south-east of Magdalena and on the San Miguel river. The trail led through a very precipitous, gloomy and wild cañon, the favorite haunt of marauding Apaches, and where, I am informed, they have massacred over 300 men, women and children within the memory of man. We traveled through it at night, and arrived at Cucurpe at an early hour in the morning. The town is perched upon a concrete knoll, whose sides fall away almost precipitously, and is several hundred feet above the river, which it overlooks. When the mines in its vicinity were being worked it was a large and flourishing place. At the time of our visit it was almost deserted, the few who were too indolent to go elsewhere being ensconced in the tumble-down ruins of former houses. On the breaking out of the contest it sent 250 men to join PESQUEIRA—scarcely twenty of whom are now left. We found the usual difficulty in getting a corral for ourselves and animals, and something to subsist on.

SANTA THERESA MINES.

Cucurpe is the center of an ancient and noted mining district, whose mines have been abandoned for many years. The most noted are those of the Santa Theresa district, 13 leagues distant in a northerly direction, and in which are the reáls Viejo, Santa Viviana and San Antonio. The principal mines are the Trinidad, San Antonio, Santa Yertrudia, Corazon de Maria, San Francisco, La Cruz, and six others,

which have been extensively worked, in the San Antonio reál; El Buro, Santa Viviana, El Mante, and several others, in the Santa Viviana reál; and a number whose names I do not know, in the reál Viejo. The San Yertrudia has a traditional fame; an exceedingly rich pocket was met with near the surface, which continued to a depth of thirty yards, when it gave out. At the present depth, fifty yards, the vein is much broken up, and only small threads of metal are found. Corazon de Maria is but a branch of it. The Trinidad, San Francisco and La Cruz have a width of three to four-and-a-half feet near the surface, with rich ores to a depth of forty to fifty yards, when the veins invariably lose their regularity, ramify and soon become lost. And so, I think, will it occur with the others of this district when developed to greater depth. The encasing formations are metamorphic limestone and the palæozoic slates; the veins have a quartz gangue. The ores are principally gray and black sulphurets and antimonial silver, with blende, arsenical pyrites and black manganese.

EL CAJON DE LA BRISCA.

El cajon de la Brisca is about seven leagues east of the town of Cucurpe. It drains a large extent of country, and falls into Saracache river. Caliche, Las Blas and El Durazno are branch ravines, and, with the adjacent table lands, have been worked quite extensively for the gold they contain. These and the placers of Santa Domingo, Santa Rafael, San Simon and El Rosario form the Brisca gold field, and are abundantly and profitably worked during the rainy season. La Sierra de la Caliche, in the vicinity, also contains gold mines, of which the principal ones are the Buena Vista and La Sierra. The first named has been worked to great extent, and considerable amounts of gold taken from a decomposed ferruginous quartz.

WHAT WE EFFECTED.

The road taken by us—there being no traveled trail—to Siniquipe, 22 leagues east, on the Sonora river, was extremely mountainous. A former traveled trail is now deserted because of Apaches, and we were obliged to find our way over the mountains as best we could. We had another terrible night with the Apaches, who abound in this neighborhood. From Siniquipe we continued south to Banamachi, and thence across the mountains to Cumpas, where we arrived on the evening of the 26th; having since our departure traveled nearly 800 miles, through a country abounding with the worst of living enemies, and the greater part of which was a wilderness where the common necessaries of life were not to be had. We had made the circuit of Northern Sonora, and visited its mineral ranges and mines, ancient and modern.

AFTER JOURNEYINGS.

I will not dwell upon our after journeyings over many of the fields already described and very many others, and the events of each day. It will be sufficient to remark that we were encompassed by difficulties and dangers which many times caused us to fear the result; but we saw the necessity of using every effort to successfully and speedily complete our mission despite personal risk and privation.

On March 16th I was furnished by the Prefector with a certified statement (A 2) [see pp. 67, 68, *ante*] and his Official Letter of Statement to the Governor of State, of which the accompanying (A 3) [see p 69, *ante*] is a certified copy, to be delivered by me to him. I made no delay in presenting these Statements, notices of Denouncements, Original Grant and accompanying papers, and Power of Attorney, to the Governor of State, at Hermosillo, for his immediate consideration. In consequence of the great pressure of war

business, I was detained here for some time—though the Governor manifested almost as great anxiety as myself to have my business satisfactorily arranged. We determined to visit Guaymas and take joint action with the Imperial Commissioner—a party appointed by MAXIMILIAN to act for him in such civil matters as might require his approval. After consultation with this Commissioner, he at once determined that I must be given possession of the lands through the survey called for by the conditions of the Grant. Don GREGORIO MORENO, the former Prefector of Moctezuma, had been captured with the other Imperial officials by PESQUEIRA, on the day after my departure from Cumpas. The Governor now appointed another, and gave me an order upon him, calling for the appointment of a Surveyor for the lands denounced. I at once returned to Oposura, and presented the order to Don ANTONIO TARAN Y BARRIOS, the newly appointed Prefector, who, after some delay, gave me a letter (A 6) [see *ante*, pp. 69, 70] to Don VICENTE PROVENCIO, appointing him Official Surveyor to make the surveys called for in the Grant. I employed two additional servants—having retained but one since shortly after my return from the Arizona journey—and continued across the mountains from Oposura to Huasabas and Granadas, on the Yaqui river, and 12 leagues east.

HUASABAS AND GRANADAS.

These towns are within a league of each other, and show more cleanliness and thrift than are generally found in Mexican towns. Quite an extensive valley of very fertile lands, eminently adapted to the cultivation of wheat, corn, sugar, cotton, &c., is in their immediate vicinity. Below Granadas, the mountains close in upon the river, leaving very little arable land.

LAM PASOS MINES.

In these mountains are the Promontorio and Lam Pasos mines. The latter, several of which are of note, have been worked to a depth of 200 to 300 feet, yielding exceedingly well. They occur in a porphyritic granite, regular and with veins strongly defined. The veins average two to four feet in thickness, and have an almost vertical dip. The ores are argentiferous near the surface, occurring in a comby quartz, and are now gradually assuming the nature of polybasite and gray fahlerz. These mines have been operated without system.

PROMONTORIO MINES.

The Promontorio mines are six leagues south of Granadas, in a conical mountain—the outcrop of their veins being 500 feet above the river. The principal mine has been worked during the past two years by several parties, though with no great success. The encasing rocks are strongly quartzose; the vein is well defined, averaging two feet wide at the surface, and at the lowest depth of workings (about 50 feet) three-and-a-half to four feet wide. The vein ores are one-and-a-half to two feet wide, and are a gray fahlerz and red oxide, the fahlerz carrying a heavy percentage of silver. A considerable quantity of ores are in sight.

LA PROVIDENCIA.

La Providencia, a mine but a short distance from Granadas, was worked to considerable extent in former times. It is now filled with rubbish, and but little can be determined regarding it. Its encasing formation is a compact diorite, and its vein is well defined and carries a quartz gangue. Its ores are argentiferous galena and chloro-bromide, seemingly well distributed throughout the vein matrix, which is about three feet in width.

The Surveyor appointed called for an escort of twenty-five men to accompany him in his survey. I refused to take more than the six measurers who were allowed him by the law. These, with the Surveyor and his father (who proposed to accompany him), and ourselves and servants, made a party of thirteen. He thought the Governor's and Prefector's orders were peremptory demands, and determined to go.

With the Surveyor and party we proceeded north eight leagues to Oputo, and thence to the lands of San Juan del Rio which I had denounced. Having found that I would be permitted to locate the four square leagues in a single tract, I had selected the San Juan del Rio ranche as containing the greater advantages in itself, and at the same time, in a sense, controlling the mines in and surrounding the Nacosari tract. Monuments were erected at each corner, and are so correctly described in the documents of survey [see *ante*, pp. 71–74 and Map,] that their locality may easily be distinguished. On the completion of the survey, I found that the tract did not, *by the measurement of the surveyors*, contain quite four leagues. Before I would accept it, I obliged them to include within the monuments a sufficient amount of lands to make up the deficiency, which they did.

The descriptions, notices and chart of survey were prepared at Oposura, and after being examined and accepted by me, were delivered by the Surveyor to the Prefector of the district, who accompanied them with a letter and gave them into my hands, sealed, to be delivered to the Governor. Certified copies of these documents are herewith presented (marked respectively A 7 and A 8) [see *ante*, pp. 70–75]. I also secured a paper from the Surveyor certifying that the lands of San Juan del Rio had been abandoned for many

years (A 9) [see *ante*, p. 75]. I succeeded in having the Prefector issue an order to the Alcalde at Oputo, to notify the people not to trespass upon the lands which I had secured (A 10) [see *ante*, p. 76]. With the documents intrusted to me by the Prefector I immediately departed for Ures—making a number of very narrow escapes on the road. We arrived in Ures on the morning of the cessation of three days' fighting between the Imperialists, who held the town, and a Liberal force—which was determined by the withdrawal of the Liberals.

The Governor and Secretary of State were in Ures; and to them I presented the package from the Prefector of Moctezuma, containing the papers of Survey and letter of Prefector. The original Grant and accompanying papers and Power of Attorney were also taken by the Governor, to be remitted to the Minister of Fomento at Mexico. I prepared a copy of the Grant and accompanying documents, which were certified to as being correct copies by the Secretary of State, and then deposited among the archives of the State. I also had copies of the Survey and other papers, the Grant and accompanying documents, and the Power of Attorney, made and certified to as correct copies—all of which are herewith presented. The *original papers*, viz: the Grant and papers connected therewith; Power of Attorney; original denouncements and notices of Prefector; copies of the *Periodico Oficial* newspaper, containing the denouncements and notices; Certificate and Letter of Statement of Prefector Moreno to Governor Astiasaran; Governor's order for survey to Prefector Taran y Barrios; Prefector's letter of appointment to Surveyor Provencio; Surveyor's notices, certificates, descriptions and plans of survey; Prefector Zubias' letter, accompanying survey, to Governor Salazar; and lastly, the Governor's letter (of which a copy is presented, marked A 11,) [see *ante*, pp. 76, 77] to the Minister

of Fomento, accompanying the papers above named, were all placed in a package, sealed and directed, in my presence, to Minister of Fomento, at the City of Mexico, *and marked with the Governor's seal.* And thus were those purposes of my mission over which I had control successfully terminated.

I must here remark that—although we were subjected to some annoyances and jealousies from the petty officials, civil and military, of the State—in our communications with the higher officials we were ever received with the *very highest* respect and consideration. They could not have shown more courtesy and kindness; and this is equally true of the better classes in the towns through which we traveled.

We left Guaymas, June 13th, *via* San Francisco, for New York, arriving there July 21st.

Very respectfully,

CUMMINGS CHERRY,
Geologist and Mining Engineer.

JAMES CHERRY, *Assistant Geologist.*
PITTSBURGH, PA., August 13th, 1866.

LETTER FROM GOV. PESQUEIRA.

The following is an extract from a letter of Gov. PESQUEIRA to Mr. CUMMINGS CHERRY, received Oct. 1, 1866—more than five weeks subsequent to the first publication of the "History of Title," on pp. 60—78 *ante.* In positive and unequivocal language, it will be seen, he repeats the opinion and promise made in person to Mr. CHERRY, as related on p. 60, and again on p. 125, *ante.*

ALAMOS, STATE OF SONORA, MEXICO,
[Translation.] July 17th, of 1866.

"Relative to the Concession of Four Leagues of untitled lands granted to you by President COMONFORT in 1857, I said to you, in

San Ramon, that as Governor of Sonora I considered it valid, and would give to you the possession of these lands immediately upon the re-establishment of Constitutional order in all the territory of the State. * * * I continue to you

A very Attentive and Sure Servant,

Y. PESQUEIRA.

ERRATA:

Page 11, line 30, *for* C. F. Hussey *read* C. G. Hussey.
" 14, " 1, *for* Priets *read* Priete.
" 22, " 12, *for* electric *read* electro.
" 27, " 16, *for* and the summit ridge *read* and over the summit ridge.
" 47, " 15, *for* sacatom *read* sacatone.
" 50, " 2, *for* equalibility *read* equability.
" 50, " 32, *for* Liberal and Imperial *read* Liberal or Imperial.
" 54, " 35, *for* Timbres *read* Fimbres.
" 57, " 4, *for* $60,000 *read* $95,000.
" 68, " 25, *for* ignorant of *read* ignorant if.
" 71, " 14, *for* as *read* so.
" 72, " 26, *for* Pañas *read* Peñas.
" 73, " 5, *for* North-West and East, *read* North, West and East.
" 74, " 4, *for* of, above, the *read* of (above) the.
" 77, " 19, *for* corrcetly *read* correctly.
" 111, " 28, *for* Janori *read* Tanori.
" 116, last line, *for* Feb. 27th *read* Feb. 23d.
" 126, line 8, *for* Euriguittas *read* Enriguitta.
" 127, " 1, place a comma after *plateaus.*
" 127, " 10, *for* chistose *read* schistose.

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